INTERNATIONAL PROJECTIONIST

JANUARY 1952

VOLUME 27 • NUMBER 1

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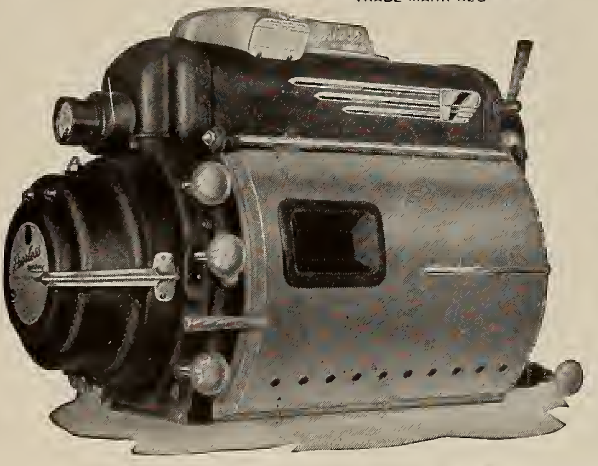

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INTERNATIONAL PROJECTIONIST

With Which Is Combined PROJECTION ENGINEERING

HENRY B. SELLWOOD, *Editor*

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MONTHLY CHAT

ONE wouldn't ordinarily expect that a craft-technical publication like IP would find its way to the desks of top management on the exhibition end of the motion picture industry. This group rarely thinks of matters technical and their importance to the over-all economic health of the industry, and on those rare occasions when they do give such matters a thought it is only for as long as it takes to refer the matter to a subordinate who is presumed to know the score. This ignorance of technical matters is a major defect in the industry's management setup.

But it would seem that top management at last will be forced by the inexorable march of events to "go technical," at least in the sense of acknowledging finally that the image on the screen is the payoff point. And it seems that not only IP but many other technical expositions will find their way in ever-increasing measure to top-management desks in the near future.

It seems that the constant pounding in this corner and elsewhere herein over the past several years prompted a group of important equipment manufacturers and distributors to make a survey of possible technological advances which bid fair to stimulate increased box-office activity. The results of this survey were then presented to top exhibition people and accompanied by the blunt warning that unless positive action were taken along the technical front in terms of improved technique, there would remain only the chore of burying that large portion of the exhibition industry which palpably has been wasting away from box-office anemia for some two years past.

Miracles of technical achievement are neither possible or expected. But if there could be a fusion of resources—financial and brain power—plus a sincerity of purpose to stay with the job until concrete results are obtained, IP is convinced on the basis of its knowledge of the present state of certain technical developments that only great good could result.

Participation of the exhibition field in such an endeavor would by no means represent a contribution by it to anything other than the preservation of its own structure; it's their house the foundation of which is crumbling and requires shoring up if its occupants are not to be engulfed by a wave of economic disaster. And not only exhibition but distribution and Labor have a vitally important stake in such a project.

We don't recall that Labor has ever been consulted on any contemplated industry course, apart from fund-raising activity, but let no one deceive himself that Labor's interests in the present situation are not as great as any other group. Its participation in any concerted action for improvement should match its stake.

The time is late; but if we must go down, let's go down fighting.

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INTERNATIONAL PROJECTIONIST

VOLUME XXVII JANUARY 1952 NUMBER 1

Projectionist's Role as a Showman

By ROBERT A. MITCHELL

Third and final article in a series which detail helpful technical hints anent the preparation for and projection of a good theater motion picture show.

THE troubles likely to occur in a projector head during a show, barring film troubles, fall into three categories: (1) stripping of gears, (2) loosening of a set-screw, causing backlash and end-play in a moving part, and (3) binding of the mechanism. Gear-stripping is largely obviated by the most careful operating technique and *not* oiling or cleaning a machine while it is running. All set-screws, pins, *etc.*, should be tested periodically and tightened whenever necessary.

Binding, when it is not the fault of the motor, is usually the result of expansion of shafts or of the star and cam of the intermittent due to heat generated by friction; causes: insufficient lubrication and parts fitted too tightly. Binding in the soundhead is camparatively rare because of the simpler gearing of that component.

Below-Freezing Temperatures

Projectionists working in northern latitudes sometimes complain of cold binding up their machines. Years ago this writer worked as a projectionist in an outpost of civilization where a temperature of 50° below zero F. was not uncommon during the long winter nights. The thermometer in the projection room once registered 20° below at 9 a.m. It was not safe to touch the projectors so early in the morning for fear of tearing the skin off one's fingers. The theater warmed up just about in time for the matinee, and even then it was necessary to run the machines in for half an hour before threading up the first two reels of film.

By ten or eleven p.m. the projection room (into which powdery snow drifted through cracks and crannies) was the warmest room of the theater. But outside, lurking in ice-crusted alleys and dancing silently under the frozen glitter of northern stars, the forces of cold awaited their nightly job of turning the oil in intermittent wells into a viscous goo.

Loss of Film Loop

Projectionists operating on certain makes of rotary-stabilizer soundheads are devilled at times by loss of the film loop between sound sprocket and lower takeup sprocket. A study of this complaint reveals that it occurs exclusively with those soundheads employing a single, not a double, idler roller on the lower takeup sprocket.

Figure 3 illustrates the general plan of these soundheads, and also the path of the film (A) when correctly threaded and (B) when a loop is lost. The damage inflicted on the film the moment the loop is lost is that sprocket holes on *both* edges of the film are ripped out by sprocket teeth.

The first thought that occurs to many of us is that the rocker arm of the idler roller has become loose, or that the idler is set too far from the face of the sprocket. Although this is rarely the case, it is always a good idea to reset the idler-sprocket distance to two thicknesses of safety film. This adjustment can be made in a jiffy.

If this expedient fails to prevent spontaneous loss of the film loop between sound sprocket and lower takeup sprocket, the interruption of the show may be avoided by either resetting the loop while the machine is running (a trick, but easy once you get the hang of it), or by simply allowing the film to run taut between these two sprockets for the remainder of the reel. This is not as bad as it may seem, since damage to the film rarely results, and, besides, the passage of a splice usually creates a "one-sprocket-hole loop" automatically.

Noticeably, the loss of the loop usually occurs when the projector is started, and also when a buckled splice passes over the sprocket next to the takeup reel. Strange as it may seem, the trouble is *really* caused by faulty and uneven action of the lower magazine takeup assembly—as well as by the manufacturer's stinginess with sprocket idlers. (There ought to be *two* idlers on the lower sprocket, as in the Simplex SH-1000 and the RCA MI-9050A soundheads.)

Corrective Action for Loop

The sure cure for loss of this loop is as follows:

1. Remove takeup belt and disassemble the lower magazine takeup assembly. Wipe all parts, friction clutches and shaft, removing all traces of grease and oil. Smooth off any rough places found on the slip-friction surfaces of the metal clutch discs. Do this very care-

fully with a fine file. (The writer has occasionally found punch burrs on these discs, but he has no idea how or why they got there.)

2. If the leather friction discs are worn to a frazzle, replace them. If oil-soaked, but otherwise good, soak them with carbon tetrachloride or Carbona in the cover of a small round trailer can. Rinse them out to remove the oil, re-soak them in fresh Carbona, and squeeze them out again. Now let them dry thoroughly, *and do not re-oil them!*

3. In putting the takeup assemblies together again, oil only the shaft—*not* the clutch discs. Try to keep all oil out of the slipping arrangement. Lubricant in this part of the projector will only make the takeup action uneven, tear the sprocket holes of film when the projector starts (due to a lag in the turning of the lower reel), and cause the film to wind up irregularly.

Tight Takeup Belt Grip

4. Be sure that the takeup belt is really tight—just as tight as you can get it. A loose belt is liable to slip now and then, resulting in very uneven takeup action. Inspect the belt staple carefully, replacing it if it shows wear.

Which side of the staple do you have running on the pulleys—the bent-over ends or the smooth side? The writer has always turned the end-side next to the pulley surfaces, but he noticed that a top-notch sound service engineer prefers to have the long, smooth side running on the pulleys. In any event, have no more than *one* staple in a takeup belt.

5. Adjust the takeup tension-spring so that a full 2000-feet reel of film placed in the lower magazine starts turning the moment the projector motor is turned on. But test the revolving reel of film with the finger in order to guard against too much tension. When properly adjusted, the film winds up tightly, yet there is just sufficient "looseness" in the roll of film to be felt when pressed with the fingers. Make certain that the tension-spring locknuts are tightened securely. Many projectionists use two locknuts on each takeup shaft as an extra precaution.

All this done, the loop of film between sound and takeup sprockets should not be lost once in a blue moon—which isn't very often.

Poor Sound Quality

Poor sound quality is proverbially a headache, especially when sound quality and volume fall steadily during the show. Whenever this happens (the theater having no emergency amplifier) first examine the soundheads to see if the exciters are burning normally. (Voltmeters for the exciters seem to be lacking in most modern equipments.)

If the sound is bad or weak from only *one* projector, the trouble very likely is in the offending machine, and may be cleared up quickly. Look for sagging or out-of-focus exciter filament, dirt and oil on the optical-tube lenses, weak photocell, or bad tube in the preamplifier (if separate preamplifiers are used).

In old-fashioned soundheads, a piece of dirt from the film may be clogging up the sound gate.

Amplifier, Power Supply

If, however, the output is sub-par from both projectors, the trouble very likely is in the amplifier or its power supply. For verification, put a record on the non-sync and switch the sound over to it momentarily. If the sound be weak from the non-sync, as well, the amplifier is clearly at fault.

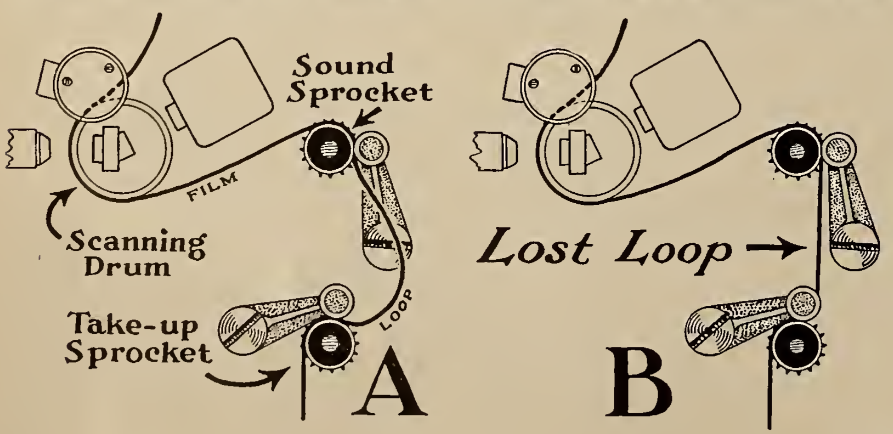
First, replace the rectifier and power tubes, as these usually deteriorate before any of the others. Also, this may be done without shutting down the show, unless there is some uncertainty as to which tubes are which. In any event, it is safest to turn the amplifier off before attempting to change tubes.

Circuit-'Savvy' Invaluable

This measure failing, throw in a whole new set of tubes in all stages. If this fails, little can be done except sending out an emergency call to the service man. The trouble may be a short-circuted, open, or "leaky" capacitor; but diagnois of the fault should be placed in experienced hands. Most projectionists do not have the requisite circuit-testing apparatus and spare amplifier parts; and, sad to state, many have not acquainted themselves with the circuit diagrams and actual wiring inside the amplifier.

Whether or not the show should be

FIG. 3. Loss of film loop, a trouble sometimes encountered in soundheads having but one idler roller on the lower takeup sprocket. *A* shows the normal film path; *B* indicates the path of the film when the loop has been lost. The remedy for this difficulty is given in the accompanying text.



William J. German Now Agent For Eastman Pro Movie Film


William J. German


Edward P. Curtis

William J. German has been appointed distributor for Eastman professional motion picture films effective January 1 last, Edward P. Curtis, Eastman Kodak Co., vice-president, has announced. German's new company will succeed to the business previously operated by J. E. Brulatour, Inc. The new company will continue to operate with substantially the same personnel in Fort Lee, N. J., Hollywood, and Chicago. Curtis pointed out that for many years the late Jules Brulatour acted as distributor for Eastman film and that during much of that period German was closely associated with him as vice-president and general manager of the Brulatour company. The distribution arrangement between Eastman Kodak Co. and J. E. Brulatour, Inc., was continued for a number of years after Mr. Brulatour's death and came to an end on December 31, 1951.

Curtis said of the new appointment: "In view of Mr. German's long experience in selling film to the industry and his wide contacts throughout the trade, I feel that the Kodak company is fortunate in obtaining his continued services in this capacity. We feel confident that the trade can look forward to receiving the same excellent service to which they have been accustomed through the years from the Brulatour company."

shut off completely depends on how poor the sound has become. There is no point in continuing the show if the audience cannot understand what the actors are saying.

CAUTION: Attempts to correct sound troubles by the busy projectionist are understandably hurried under the pressure of extreme urgency—nor does the presence of a distraught manager help matters. When changing tubes, it is well to remember therefore, that there is *only one* correct position for each tube in its proper socket.

With keyed tubes this kind of error cannot occur; but with tubes not having a center key, a mistake may be made if the sockets are worn to the extent that they allow insertion of the larger filament prongs of the tubes into plate or grid jacks. Note carefully, when removing tubes, the position relative to the holes in the socket of the two large prongs of each and every tube removed. Replace tubes *one at a time.*

The technique of closing a show is a matter of controversy. A show is over when the final THE END title fades out; and it is best to empty the theater of patrons as quickly as possible. For this reason, the title curtain should be closed when the motor cue flashes on the screen, and the grand drape closed and the houselights turned on when the final changeover cue appears.

Footlights and other decorative lighting on the stage should not be turned on. The only exception is the theater having houselights so dim that the footlights must be used as auxiliary lighting. (Modern theaters, like the old-time houses, have *bright* auditorium lighting. The fad of very dim lighting, with its suggestiveness of unseen dirt and untidiness, is definitely *passé.*)

Music from the non-sync should be omitted at the very end of a performance, as it induces many patrons to loiter in the auditorium. If the manager insists on music at the end of the show, it will have to be played, of course; but its disadvantages should be pointed out to him.

But if the performances are continuous, being separated from one another by short intermissions, this fact can be indicated by closing only the title curtain, turning on colored footlights, and playing music by way of keeping the stage "alive." This technique conveys to the audience the information that the entertainment is shortly to be resumed, and that the "break" is only for the convenience of patrons leaving or entering.

The opening of the following performance will be identical with the first opening of the afternoon or evening, except that the grand drape will already be open.

[THE END]

'New Deal' Between Films & Tv

By DR. ALFRED N. GOLDSMITH

Although we can't go all the way with Dr. Goldsmith in terms of Tv's impact on film exhibition, we know (as do all IP readers) that the Dr. knows both his films and his Tv. The appended article, originally contributed to *Variety's* Jan. 2 Tv roundup issue, reflects the usual Goldsmith interesting style and sure grasp of essentials.

THERE'S no quarrel like a family quarrel. (Two sisters may think the world of each other, but if they differ, the sparks fly!) And there's no business like show business. These are two reasons why a family argument in show business is one for the books. But after the fireworks, it usually ends in a friendly understanding.

Frankly, I'm on the subject of films versus television. Just now these sister arts occasionally screech at each other. Sometimes they approach the hair-pulling stage. And all to no purpose. Sooner or later they will have to kiss and make up. Each needs the other. Each can benefit from the other. So, while a scrap is sometimes good fun while it lasts, it's got to end some day. Eventually—why not now? The present is no time for lost motion and waste effort in the U. S. A.

Similarities—and Differences

Having watched the growth of both arts in closeup. I can find many elements of similarity and areas of agreement—as well as some differences.

Each art appeals to the eye and ear. Each tells its story on the screen and through the loudspeaker. Television pickups can be used to make films (so-called kinescope recordings). Film cameras can make film for television. The studios, their lighting, sets and operation have close resemblances for each of these arts. Good film actors do well on television in most cases, and *vice versa.* Competent directors have some difficulty transferring from one field to the other—but not too much.

The story material suitable for the motion picture can be adapted to successful television use in many instances. And of course such articles as lenses, lights, microphones and controls serve almost interchangeably.

Parallel Development

All this is natural enough. For both are developed along parallel lines. Originally films appealed only to sight. They played, in effect, to a deaf audience. Radio, on the other hand, played only to the ear and left the audience blind, so to speak. Then each art decided to supply the missing sense. Sound was added to the silent pictures. Sight was added to radio—and television arrived. During the last 15 years they may almost be said to have developed together—little as some will like this statement.

Equally natural is the fact that their problems are similar. Each must provide a sharp, bright picture. Each must deliver clear and natural sound. Each needs good color reproduction. Each must supply attention-holding stories, capably acted. Each has continually to find new forms, stories, and methods to avoid losing its audience. And each has serious economic problems partly arising from ever-increasing production costs. (Scratch a film mogul and you find a Tv magnate.)

So both ended up as visual-plus-aural program media. As a matter of fact, when each is handled properly, it is not too easy to tell them apart.

Mutual Aid Opportunities

Still more important is what each art can offer to help the other. Films can offer television excellent short subjects, dramas, comedies, documentaries, sports event records and cartoons. Pictures can supply outstanding film commercials for television. Much of the equipment and know-how of the films can be partly transplanted to television and film clips

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A Few Questions for Mr. Skouras

From "International Photographer"

Charles P. Skouras has this to say about the Eidaphor Tv color system: "This will mean the end of the motion picture musical. We'll produce stage shows in color and put them in the movie theaters across the country."

Let us question Mr. Skouras as to how many of these he can store on the shelf to build up a reserve if it is not to be put on film. Let us ask him how many stars he has whom the public will accept. After all he is selling, but someone else is buying. Let us ask him what he plans to do when the star decides to take a holiday or becomes indisposed. Let us ask him how long he intends to keep a company in rehearsal. Let us finally ask him why he toys with the thought when the average in producing successful musicals on Broadway is about one out of 25.

Please, Mr. Skouras, control your enthusiasm. Everything in show business is not make-believe.

fit beautifully even into some television live productions. This list could be continued much further—but the point is already obvious.

On the other side, television has much to offer pictures. Compact television cameras can be used to supervise and control economical filming. Television editing techniques, properly adapted, can reduce film production costs without significant loss of quality. Through their high sales impact, television broadcasts of film trailers can promote theatre attendance. Television can create or publicize stars for the films. Television offers an enormous potential market for the film producer in the future—and will perhaps be his greatest outlet. Theatre television can further stimulate theatre attendance. And so on.

Fresh Start Advocated

Each field has made its mistakes in its own development and in dealing with the other field. Why not let this be water over the dam—and start fresh on a rational and businesslike basis? Cherished misunderstandings will lead only to an entertainment "Heartbreak Ridge." But sensible cooperation will put lots of black ink in the right place on the balance sheets of films and television alike.

I am sure there is no bankruptcy of ideas, ingenuity, and ultimately of good will and common sense on either side of the fence. This being so, constructive statesmanship and a real "new deal" are in order.

Du Pont's New 'Thin' Film Related to 'Dacron' Fiber

An entirely new synthetic base for photographic film has been developed by the Du Pont Co. It is several times tougher and has much greater dimensional stability than any of the present types of film base, states Du Pont. Classed as a safety base, it is less flammable than present safety bases. The new material, technically known as a polyester, is chemically related to "Dacron" polyester fiber, the newest Du Pont synthetic textile fiber. Both are condensation polymers made from ethylene glucol and terepthalic acid.

Impressive Advantages Cited

Polyester base is exceptionally tough. It has twice the tear resistance of the standard acetate or nitrate base film, says Du Pont, and can be run through a projector from three to four times as long before perforations show appreciable wear. Because of its toughness and greater stiffness, polyester film may make it possible to reduce the thickness of motion picture film by at least 20%, with a resulting greater footage per reel and accompanying savings in processing and handling.

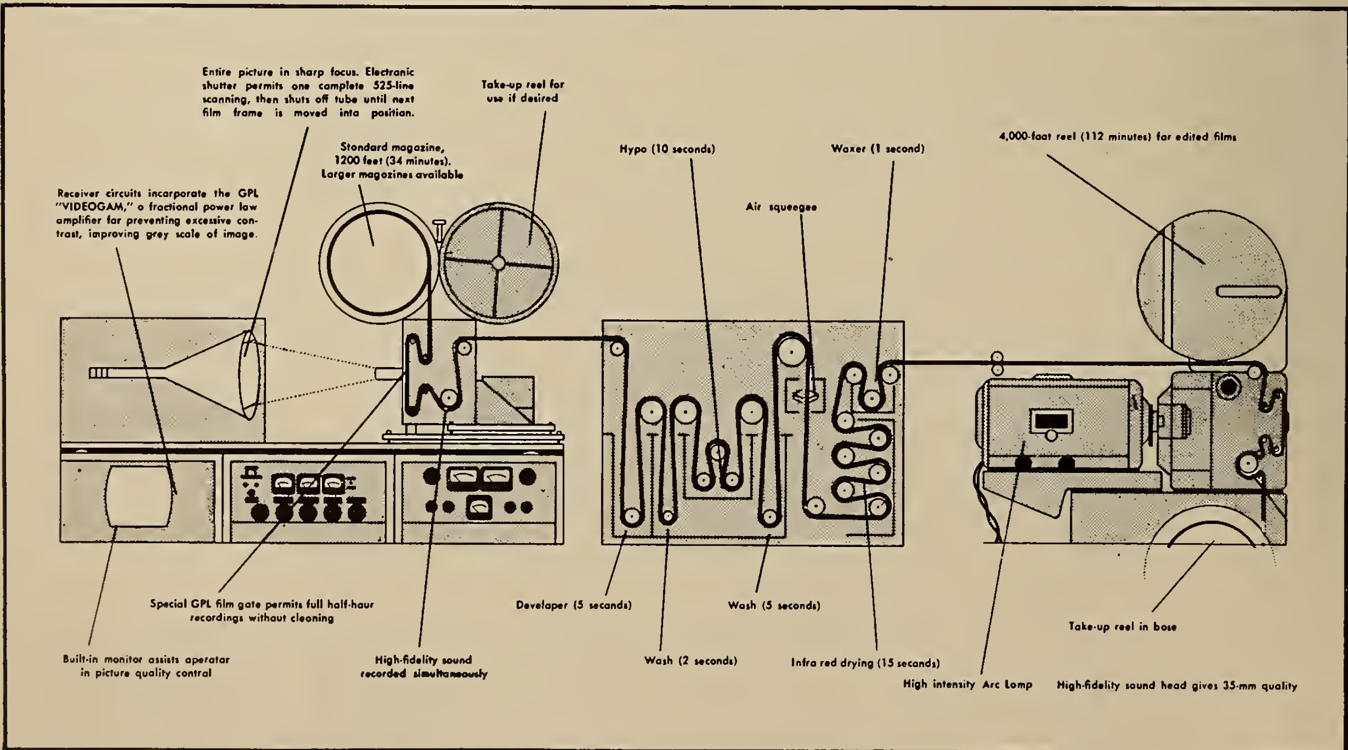
The dimensional stability of the new base offers important advantages, particularly in the motion picture and graphic arts fields, where close tolerances are essential. Polyester base keeps its shape remarkably even under the most extreme conditions, and such microscopic changes as do occur are much smaller than in existing films. Another important characteristic is its lack of brittleness at low temperatures.

Large-scale production is dependent upon the results of evaluation tests now being conducted. If all tests are met satisfactorily, more than two years will be needed to design and complete large-scale manufacturing facilities.

Competent engineers welcomed the new film base on the score of more film per reel and a partial reduction in the seriousness of the 16-mm emulsion position problem because emulsion in the non-standard position would then be a little less out of focus.

Thinner film base, however, implies out-of-focus scanning in theatre and recording heads, similar serious trouble in recording machines (which could be corrected by a wholesale change to thinner stock and refocusing) and the automatic increase of magnetic print-through when thinner film is coated with a stripe of magnetic material. Newsreels of some years ago were printed on "thin-base" stock, but the difference was less than half of the reduction mentioned for this new Du Pont stock.

Currently there is 16-mm film with emulsion on either side, 35-mm black-and-white, and 35-mm color film. Soon we have a magnetic track on release prints. All this leaves ample room for error on the part of even the most careful projectionist, due to the need for constant refocusing when changing from one stock to another.



Block schematic of entire GPL Videofilm system, from Tv picture tube to 16-mm film projector

BRIGHT IDEA for BETTER BOX OFFICE!

● *Outside* the theatre, light merely helps to get your patrons in. *Inside,* however, light on your screen is literally the whole show. It alone must fulfill the expectancy of gripping scenes . . . startling close-ups . . . of color gloriously revealed in costume and setting — all the elements of PERFECT ILLUSION.

If *yours* is one of the large percentage of inadequately lighted indoor theatre screens, *ask yourself:* Are my lamps aligned and in proper trim? Electrical equipment in good working order? Screen reflectivity within the limits of recommended practice?

Remember, "NATIONAL" projector carbon lighting costs less — and means more — than any other exhibitor expense. Don't wait for the box office to remind you that something is wrong. "NATIONAL" Projector Carbon Distributors and our Lighting Specialists are always available to make specific recommendations for improving the light on your screen.

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Addendum:

SMPTE Report on Screen Brightness

THE results of a survey by the Screen Brightness Committee in 125 indoor theaters and 18 West Coast studio 35-mm review rooms have recently been presented herein.* These included data on theater seating capacity, screen width, screen brightness, side- and corner-distribution and screen reflectivity.

The survey data included measurements of the incident illumination on the theater screen at the center, the two sides and at two diagonally-opposite corners. These data make possible an analysis of evenness of balance of illumination on the screen.

Side- and Corner-Unbalance

Figures 1 and 2 show the range of side- and corner-unbalance observed with the 251 projectors in the indoor theaters, and with the 36 projectors in the 18 West Coast review rooms. Side-unbalance is defined as the difference between the two side-readings of intensity of illumination on the screen divided by their average, expressed as a percentage.

The corner-unbalance is similarly determined from the two corner readings for each projector. These unbalance values can also be expressed as the ratio of high-to-low value, and this scale is shown at the tops of Figs. 1 and 2. These refer solely to the variations over the screen with individual projectors.

Figure 1 shows that a little less than one-third of the theater projectors had a side-unbalance of 10% or less. Another third had 10% to 30% unbalance. About 18% of the projectors had an unbalance greater than 40%—which means one side was 50% or more higher in intensity than the other!

Wide Corner-Balance Range

Figure 2 shows an even wider range of corner-balance. One-quarter of the theater projectors had a zero to 10% unbalance; over one-third had 10% to 30% unbalance, and almost one-fifth were over 40% out of balance. Approximately 5% had over 70% corner-unbal-

* IP for Nov., 1951, p. 18.

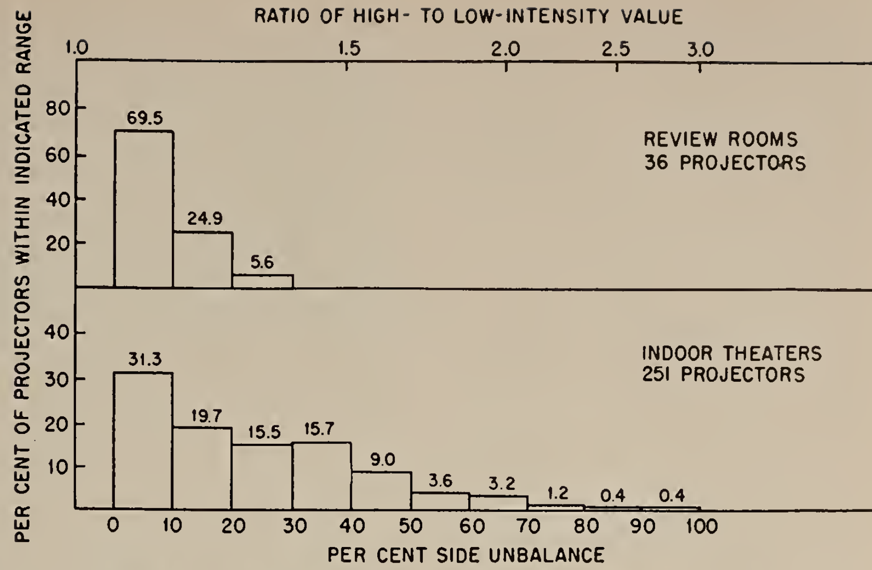

FIG. 1. Unbalance of intensity of illumination at sides of screen. Range obtained in the survey refers to side-to-side difference on the screen with the same projector.

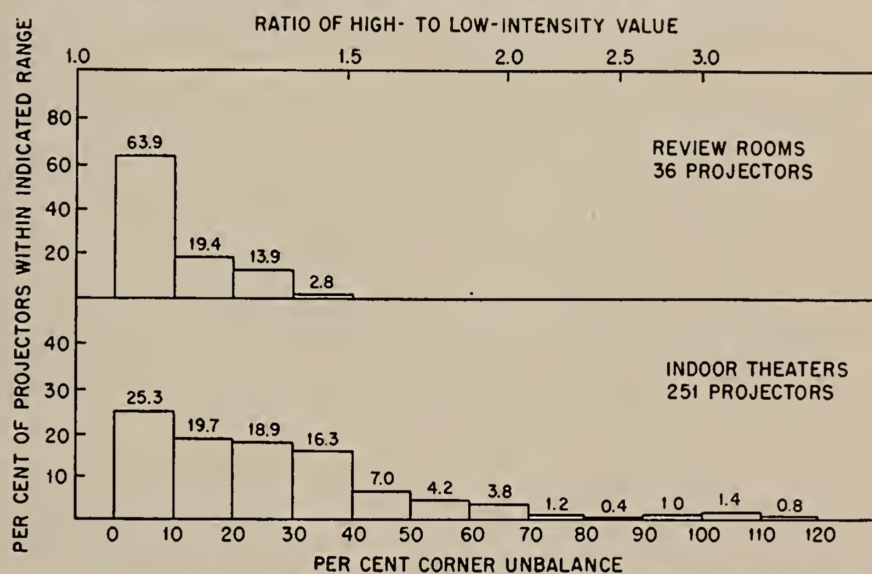

FIG. 2. Unbalance of intensity of illumination at corners of screen. Range obtained in the survey refers to corner-to-corner difference on the screen with the same projector.

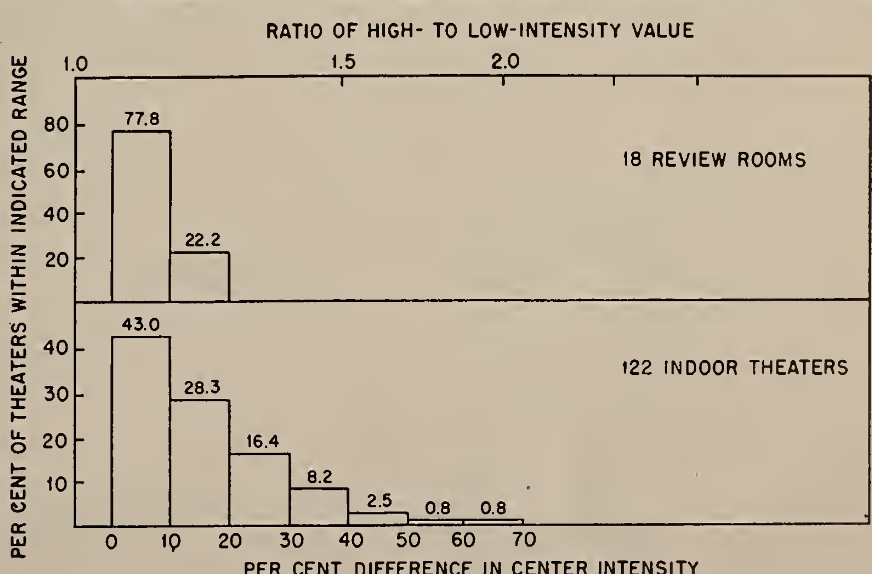

FIG. 3. Difference between projectors in each theater in intensity of illumination at center of screen. Range obtained measures change observable at changeover.

ance, which means that one corner-intensity value was more than *twice* that of the other.

The data on the review rooms are in striking contrast with the indoor theaters, and show almost two-thirds of the projectors to have less than 10% side- and corner-unbalance. This better review-room performance will be evident in the further comparisons to be shown.

Projector Unbalance in a Theater

The percentage difference in intensity of illumination at the center of the screen has been determined for the two projectors in each theater. (The *maximum* difference was used in cases where there were more than two projectors in a single theater.) This, then, is a measure of the change in illumination at the center of the screen at the time of a changeover. The distribution of such center-of-screen differences for 122 indoor theaters is given in Fig. 3.

About 40% of the theaters had a difference of zero to 10% in center-of-screen intensities for their projectors. A little over one-quarter of the theaters had a change of over 20%. More than three-quarters of the review rooms show less than 10% difference in intensity between projectors at the center of the screen.

In addition to the changes in intensity at the center of the screen, at the time of a changeover, changes in unbalance of illumination on the screen are also observable. Figs. 4 and 5 show how the side- and corner-unbalance differed between the two (or more) projectors in the 122 theaters. Two factors contribute to a change in unbalance of sides and corners. One of these is the change in magnitude of unbalance in going from one projector to the other; the other factor is a change in direction of the unbalance.

Intensity Factor Variable

For example, if the side of higher intensity is on one side of the screen with one projector, and on the other side of the other screen with the other projector, then this would produce a noticeable shift of unbalance at a changeover even though the magnitude of unbalance were the same in both cases. This was measured by combining the numerical magnitude of unbalance in such cases; these theaters are represented by the shaded portions of Figs. 4 and 5.

Approximately one-quarter to one-third of the indoor theaters and review rooms experienced such changes in position of side and corner of highest intensity at the changeover.

Figure 4 shows that about one-third of the theaters experienced a zero to 10% change in side unbalance. Almost one-half experienced a change in unbalance of more than 20%. Fig. 5 indicates that the change in corner unbalance runs slightly greater than the change in side unbalance. Note that the large changes in unbalance are contributed primarily by the shaded portions, and represent, therefore, a change in position on the screen of the side or corner of higher intensity. The change of unbalance of the review rooms is much less than that of the theaters, as would be expected from the smaller unbalance of the individual review-room projectors as shown in Figs. 1 and 2.

Light Unbalance Prime Trouble

These data have indicated that many theater screens are illuminated in a noticeably, and in some cases objectionably, unbalanced manner, considering both individual projectors and also changeovers between projectors. The much better balance of the review-room screens is believed to indicate the practicability of theater improvement. Many factors can probably contribute to such improvements, ranging all the way from installation of better-designed equipment in some cases to simply better adjustment and operation of existing equipment in other cases.

The Screen Brightness Committee recognizes a primary responsibility in setting up workable recommended practices regarding intensity and distribution of screen illumination which will insure effective projection of motion pictures. However, until these are formulated, many of the undesirable situations can be greatly improved by better attention to the details of operation and maintenance of existing equipment.

Microfilm Edition of IP Available

Reproduction and distribution of a microfilm edition of INTERNATIONAL PROJECTIONIST to libraries is now being done by University Microfilms, 313 North First St., Ann Arbor, Mich., under the terms of an agreement recently concluded.

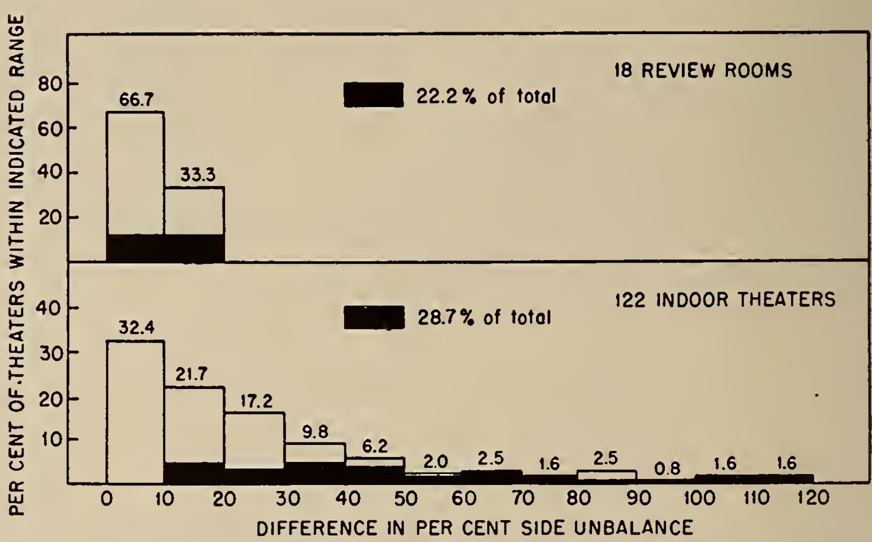

FIG. 4. Difference between projectors in each theater in side unbalance. Range obtained in the survey measures change observable at changeover.

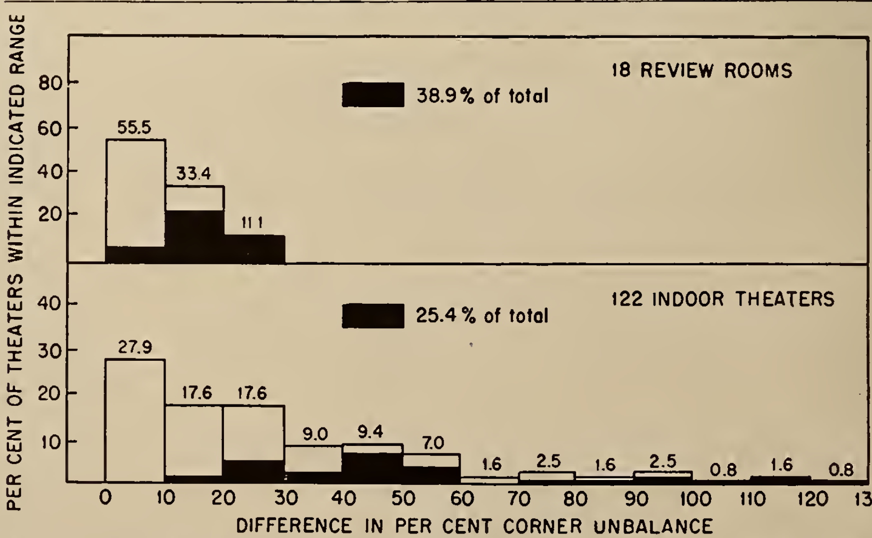

FIG. 5. Difference between projectors in each theater in corner unbalance. Range obtained in the survey measures change observable at changeover.

NEW KOLLMORGEN OPTICAL PLANT NOW OPERATING IN NORTHAMPTON, MASS.

Second manufacturing unit for Kollmorgen optical products, including Snaplite and Super Snaplite motion picture projection lenses. Here more than 45,000 square feet of space on one floor is arranged for maximum manufacturing efficiency. The other Kollmorgen plant is, and has been for many years, in Brooklyn, N. Y.

Kollmorgen's New Optics Plant

NESTLING in the Berkshire Hills at Northampton, Mass., is the new and ultra-modern plant of a manufacturing company which has played a vital role in the advancement of motion picture projection, no less than in other fields where precision optical and mechanical equipment is required. This plant—representing the ultimate in planning, construction, appearance and functional worth—is that of the Kollmorgen Optical Corp., for many years a bulwark of motion picture technology.

Located on five acres of ground which provide ample space for expansion, this new Kollmorgen unit is 340 feet long, 120 feet wide, and adds 45,000 square feet of manufacturing space to this pioneer optical company's production facilities. These facilities supplement those available at the original Kollmorgen plant at 2 Franklin Avenue, Brooklyn, N. Y., which will be continued in operation.

Why a town like Northampton? Well, the Kollmorgen choice confirms the judgment of many major manufacturers of precision material to escape the congestion, the dirt-laden air, the transportation bottlenecks, and, necessarily. the compulsion of operating in out-moded vertical structures which unduly complicate operations.

TOP KOLLMORGEN EXECUTIVES

John L. Maulbetsch, vice-president in charge of production, and E. O. Kollmorgen, president.

Historic Industrial Area

Northampton, too, because the Connecticut Valley, long regarded in industrial circles as the "workshop of the nation" as regards inventive talent and mechanical skill, has an ample supply of skilled labor, a record of harmonious relations between management and labor, excellent communications and transportation facilities, and, by no means least, pleasant living conditions. Additionally, excellent research talent and equipment in noted education centers lies within a ten-mile radius of Northampton: Smith, Amherst, Mt. Holyoke, and the University of Mass. Nor is the famed Mass. Institute of Technology too far away for effective cooperative effort.

Kollmorgen Precision Products

The Kollmorgen plant is new only in structural content, because it houses workers and a tradition of expert craftsmanship which over a fifty-year span have contributed to the firm's eminence in the manufacture of precision materials. The Kollmorgen organization is an outgrowth of the old Eastern Optical Co. which was formed around the turn of the century in Brooklyn, N. Y.

In 1916, Dr. Frederick Kollmorgen—who had been an optical consultant for Ross, Ltd., of London, and Keuffel & Esser, of Jersey—joined Eastern, which was then incorporated under the Kollmorgen name. Since then the firm has progressed steadily in size and in the variety of products produced. Regrettably, George Haas, co-founder of the Kollmorgen Company, died just a few days before the Northampton plant was opened.

Kollmorgen is widely known in the motion picture industry by reason of its Snaplite and Super Snaplite projection lenses, which have gained the favor of projectionists nation-wide; but it also makes various other precision products, including mechanical parts made to a high order of precision and which do not involve optical work at all.

In addition to movie projection lenses and sound reproducing optical units for both 35- and 16-mm film, Kollmorgen makes "still" projection lenses, telescopic spectacles for the partially blind (one of its finest achievements); periscopes for industrial uses, the famous Bear Cub rifle scope, and special lenses for television work.

Kollmorgen looms large on the national defense horizon. Back in 1916 the U. S. armed forces were almost wholly dependent upon European industry for their major optical instruments. Kollmorgen tackled first the exacting job of building submarine periscopes, and so well was this task performed that the company gained and never lost since its pre-eminent position in this activity.

Diversified Optical Work

Today the company makes a variety of precision instruments for the armed services, including navigation aids, target detection devices, and units for the control of torpedo or gun firing. During World War II, Kollmorgen attained the coveted Army-Navy "E" five times.

The rapid expansion of activities has never been the aim of Kollmorgen, as might be guessed from the fact that precision work is the first and continuing guiding principle for all its effort. Full realization of this fact is had when one learns that Kollmorgen made the optics for the Springfield, Mass., Planetarium, is now making the optics for the Boston Planetarium, and has also done work for the famous Hayden Planetarium in New York.

"After all," says E. O. Kollmorgen, who now heads the firm, "these plane-

DISTINGUISHED FATHER-AND-SON TEAM

Dr. Frederick L. D. Kollmorgen, co-founder of the company, and his son, E. O. Kollmorgen, who now directs company activities.

tarium instruments are really projection units—and we think we have established definitely that we know something about that art." And so they have, if one considers the thousands of Kollmorgen projection lenses in use around the world.

Personnel a Prime Asset

"Our products, and therefore the progress of our firm, are a direct reflection of the quality of our personnel," is the view of Mr. Kollmorgen. "We're proud of the fact that many of our people have been with us for more than 25 years, and we think that this vindicates our policy of a continuing interest in employe welfare, including good pay, stable employment, pleasant working conditions, and suitable employe benefits. We're more than proud of never having lost a minute's production time as a result of labor difficulties."

Second in command at the Kollmorgen plant is Dr. John L. Maulbetsch, vice-president in charge of production, whose outstanding ability in the field of optics is recognized world-wide, and who is no stranger to the pages of IP by reason of his many enlightening discussions anent optics herein.

Of the Kollmorgen personnel, perhaps the best known to projectionists is Joseph A. Fetherston, sales manager, whose frequent swings about the country and many appearances before projectionist groups have marked him as a special friend of the craft.

When operating at full capacity, the new Kollmorgen plant will have a complement of about 275 employees of specialized skills who will work in an ideal, air-conditioned plant that boasts of every modern facility for the production of precision optical and mechanical instruments. Thus is vindicated the years-long policy of Kollmorgen of serving themselves well by serving the trade best.

To Mask— or Unmask

IN THIS current fever anent proper masking—or, rather, unmasking—of the motion picture screen, IP seems to favor the Ben Schlanger method as opposed to that which was employed at the recent Festival of Britain show.* Sure, the Schlanger method is more simple; but I favor the British technique of obtaining general illumination levels from the film and projecting these through a "blocked-out" aperture to the edges of an oversize screen.

Here is why I favor the British method: the "wings" on the Schlanger screen reflect back to the screen proper sufficient illumination to diminish contrast values (to diminish gamma, photographically speaking) whenever the projected scenes have a high level of brightness. It can't help but work out that way.

True, most of the average audience would have to watch pictures on this screen for a month of Sundays to catch-on to the fact that something was radically wrong; and by that time the novelty of distracting extraneous illumination would wear off. They would plead, *beg*, piteously, for an old-fashioned black-masked screen which permits the audience to see *all* of the picture, without loss of contrast and distraction.

All illuminated surrounds have the horrid effect of making the picture look as *flat* as a deflated pancake. Conventional masked screens, especially the round-cornered variety which I advocate with vociferous pendiculation, *overcome* the *real* flatness of the picture by rendering it *less noticeable*.

Public Preference Questioned

I disagree completely with statements that the public prefers illuminated screen surrounds. Such surrounds are preferred by a *minority* of moviegoers. I have tried the system out on 16-mm and have sampled a sufficiently large number of reactions to convince me on this point, even though I could not simulate theater conditions. The illuminated surround is a freak, interesting only so long as it is novel; a deadly bore when forced on patrons all the time.

I say this, however, with profound respect for Schlanger in waging an arduous, lone-wolf battle for what he (and a few other technicians) believe is a good thing. I (maybe a lone-wolf, too) prefer to see just what the camera sees, without gew-gaws and other distracting furbishments.

Incidentally, what does Dr. Kalmus of Technicolor think of illuminated *vs.* masked screen surrounds? It might be interesting for you to plumb the feelings of cameramen on this matter.

* Projection in Britain's 'Telekinema'; IP for Oct., 1951, p. 11.

Audience Reaction the Payoff

The appended commentary is a joint effort by BEN SCHLANGER, architect, and WILLIAM HOFFBERG, engineer, who have done yeoman pioneering work in the development of illuminated screen surrounds.

Many thanks for the advance "look-see" at the Mitchell estimate of the maskless screen. This pre-publication submission of material by you to all interested parties is to be commended, because it affords, and properly, an opportunity for simultaneous rebuttal.

Mr. Mitchell asserts that the maskless screen reflects *back* to the screen proper

EXECUTIVE AND SUPERVISORY PERSONNEL AT KOLLMORGEN OPTICAL CO. NEW PLANT

Pictured here (left to right): John J. Oxley, secretary; William A. Rudd, treasurer; John L. Rawlings, chief design engineer; A. N. Ciaffardini, head of electronics; Harry Friedman, chief optical engineer; John Milligan, asst. to the president; Harry Theuer, production manager; Oscar Brutsch, mechanical superintendent; Joseph A. Fetherston, sales manager, and Richard Walsh, purchasing agent.

THE SCHLANGER MASKLESS SCREEN SURROUND IN TWO RECENT INSTALLATIONS

Showing how the screen surround appears in relation to the proscenium and sides, and to the front rows of seats. The surround is made of the same material as the screen, with no accessory optical unit being necessary.

"sufficient screen illumination to diminish contrast values," etc. We made many tests on just this point, and we are satisfied that our screen does no such thing. Sure it took years to find an available practical material which when properly applied would reflect screen light to the eyes of the audience and *not* back to the screen. Our Scarsdale, N. Y., installation confirmed our views on this topic.

Questions 'Off-Hand' Evaluations

It takes a lot of doing to overcome the "bugs" in any new development, and we were lucky in being able to track down these "bugs". What puzzles us is these off-hand estimates of the worth of the maskless screen in the face of our years of experiment with this form of presentation—and we say this with all modesty. After all, we too are aware of the simple law of angle of incidence and angle of reflection.

Another puzzler to us is just how those who are not too close to the matter can blandly estimate with seeming authority just how many moviegoers prefer the "right kind" of screen surround illumination. For our part, we feel that we went right to the source of the only opinion that counts—the paying patron. Following our Scarsdale installation, the same exhibitor ordered another installation for the Plaza Theatre in New York City—a house which is generally regarded in film circles as a top-flight operation in terms of location, type of patronage, admission charge, and manner of presentation. Also, we have had a maskless screen installation in New Haven, Conn., for the past three years.

Patron Reaction Controlling

Probably Mr. Mitchell would blush if he heard the reaction of patrons at these three theaters after viewing the maskless screen. Black masking draws such comments as "morbid—boxed-in—looks like a picture on a wall; while the maskless screen is described as "cheerful—natural—scenic—better color".

As for the production people, cameramen never gave too much thought to auditorium viewing conditions, simply because they never bothered to make a thorough study of the projection end. This applies to producers of color as well as to the black-and-white boys.

We feel that one can't count the election results until the returns are in. Patron reaction, which has been splendid thus far, has been our chief concern up to now—and we have a raft of *professional opinion* in our favor also. We'll tackle the Hollywood contingent after the election returns are in.

RCA Takes Over Distribution of the Maskless Screen

Coincident with the third major installation of the Schlanger-Hoffberg maskless screen, at the Plaza Theatre, N. Y. City, it was announced that RCA will handle distribution of the screen through its supply dealers throughout America.

The wide-vision screen features side wings and a top panel which pick up and reflect diffused light from the picture. When color pictures are shown, reflected hues appear on the wings and panel. This imparts to the patron a new and dramatic sense of realism by making the action on the screen appear to occupy a larger portion of the field of vision. It is made of RCA Snowhite screen material, a heavy-weight Firestone "Velon" plastic.

Indirect, Varying Lighting

Because the wings projecting from the screen are not directly lighted, but only pick up illumination from the screen, the intensity of light and the predominant color these panels reflect will vary and remain continuously proportionate to those present in the picture on the screen. The optical impression is that of viewing a "live" scene, where vision is concentrated on a particular object or in a certain direction, but the viewer is conscious of surrounding area at which he is not looking directly.

The screen allows for this peripheral vision, or "seeing out of the corner of the eye," in contrast to the sharp cut-off necessary in the conventional theatre screen, which gives the viewer a picture sharply outlined against a black background.

The wide-vision screen consists of the image screen on which the picture is actually projected, narrow (9-inch) flanges set at a relatively acute angle to the screen, and wings projecting from the flanges at the sides and from the top of the projectioon screen.

The picture image is "framed" on the screen by the flanges, which perform the same function as the usual black masking to eliminate fuzzy edges, but diffused light and color from the projected picture are picked up by the wings at sides and top of the screen. Reflection of light on these wings eliminates the sharp, contrasting outline of the screen image and makes it appear to taper off in the outer portions of the spectator's field of vision.

BOOK REVIEW

LENSES IN PHOTOGRAPHY, by Rudolph Kingslake. *8½ x 5½ inches, cloth, 246 pages, with alphabetical index and extensive bibliography; profusely illustrated. At all Kodak dealers, book and department stores. $2.95.*

Written by the Director of Optical Design for Eastman Kodak Co., this book approaches the subject in a simple and straight-forward manner which is as non-technical as a complete explanation of the subject permits. It is divided into twelve concise chapters which discuss perspective, light rays and other lens aberrations; light waves and how they behave; definition and resolving power, depth of field, the brightness of optical images, types of photographic objectives, lens attachments, enlargers and projectors, stereoscopic photography, shutters, view-finders and range-finders.

Many of the subjects the author discusses are put before the photographic field for the first time in popular form. For instance, certain types of perspective distortion can occur with the finest lenses made. Most advanced photographers know about this and recognize some of them. Only a few, however, have anything other than the vaguest notion about the reasons for these distortions. A similarly small number know what to do about avoiding or correcting the difficulties. This book gives the answers to such problems.

In addition, the chapter on photographic objectives points out the virtues and faults of all the currently used lens designs. It makes clear the differences in performance as well as the structure.

IN THE SPOTLIGHT

By *HARRY SHERMAN*

Much informative materiel planned for The Spotlight *this month is lacking because of the sudden severe illness of its conductor, Harry Sherman. The staff of IP—and we are sure, all IP readers—regret exceedingly this untoward circumstance and join together in the ardent wish for Mr. Sherman's speedy and complete recovery. To all those who, learning of the circumstances, have graciously expressed their concern and good wishes—many thanks.*

EMBARKING upon a new year, one naturally speculates on the probable turn of events before the turn of another year. The situation as regards the exhibition field, our special interest, is confused, to say the least, and we doubt whether top management itself would care to make any hard and fast predictions as to state of affairs one year hence.

We don't presume to know what management contemplates doing within the coming year; but the course to be followed by the projectionist craft seems to us to be clear: we must hue to the line and, irrespective of happenings on the management level, proceed in such fashion as to be ready to capitalize on any favorable turn.

An intensive educational campaign should be instituted by the craft in all sections, extending right down to the local level—and by this we mean not only Tv but also *the related arts.* Every effort should be made to maintain manpower levels. Our Uncle Sam is depending upon us to go all out in the conservation drive. The campaign for good ventilation and at least adequate sanitary facilities in projection rooms should be prosecuted vigorously.

No matter what happens, we must not stand still; and in this connection it should be stressed that these forward steps are not the sole concern of Local Union leaders: concerted action by every last man is needed. Whether fortune smiles on us or not during the coming year, let it not be said that the outcome was decided by any sloughing-off on our part.

• Al Becker really needs no identification here—he is as much a part of Buffalo as the letter "B," by reason of having been a pioneer projectionist and, subsequently, one of the best-known theater equipment supply men in the business. Fifty years in the motion picture industry—that's Al's record, and along the way he has earned the friendship and respect of the industry.

Mike Berkowitz, New York Local 306, who "broke in" as a projectionist with Al, away back in the 1890's before there was any union organization, and who in later years served as president of the 25-30 Club, will read this item with special interest.

• Sidney E. LeBow, vice-president and business representative for Local 546, Lowell, Mass., was recently re-elected secretary-treasurer of the Lowell Central Labor Union for the 18th consecutive year.

• We were delighted to hear that Nick Bonansinga, former secretary of Local 323, Springfield, Ill., has completely recovered from a protracted ailment that confined him to the hospital for several months. Nick, we are happy to report, is back on the job.

• Bert Ryde, business representative for Buffalo Local 233, was elected to the board of directors of the Buffalo Variety Club, and also as a delegate to the International Variety Clubs' convention which will be held in Las Vegas, Nev., next April.

Albert F. Ryde, Business Representative, Buffalo Local 233.

• The Indiana State Association held its annual meeting at the Hotel Lincoln, Indianapolis, on December 5 last. Needless to say, the effect of theater Tv on the craft was a hot topic for discussion. At the present time, the Paramount Theater in Hammond, Ind., is the only theater in the State with theater Tv equipment (GPL).

The Tv equipment is operated by the projection room personnel, with additional manpower during Tv broadcasts. This will be the pattern for all IA Locals in Indiana when operating theater Tv equipment.

The Association donated $50 to the Will Rogers Memorial Hospital at Saranac Lake, N. Y., after a stirring appeal by IA Representative John Fitzgerald, who is also president of Cleveland Local 27.

• Well, a note on our pad tells us that our very good friend Hector Stewart, member of Buffalo Local 233, had a double celebration on the 24th of this month—his 57th birthday and his 23rd wedding anniversary. Congratulations and the best of luck to two grand people—Nettie and Hector Stewart!

• Recent out-of-town visitors to IP offices: Sam Isaacson and Carroll Bayne, president and business representative, respectively, of Baltimore Local 181.

• Harvard O'Laughlin, business representative for St. Louis Local 143, recently concluded negotiations with some 90 theaters on the basis of a three-year contract calling for an increase of 2½% for each of the three years. The new contract is retroactive to September 1, 1951.

• Twenty-four years on the same job is the record held by Local 253 members Floyd Spencer, Oscar Holmes, and J. Seadelk, all projectionists at the Palace Theater, Rochester, N. Y.

• We never tire of reporting this item. A wage dividend of an estimated $20,300,000 will be shared next March by

about 48,000 Eastman Kodak men and women in the U. S.

This is the 40th year of the wage dividend plan at Kodak! In the payment on March 7, 1952, eligible persons will receive $27.50 for *each* $1000 earned at Kodak during the entire five-year period of 1947-1951. Last year employes also received $27.50 per each $1000 earned during the five years. Approximately $18,000,000 was paid in the 1950 wage dividend. The dividend is paid *in addition to regular wages* and has no effect on wage rates.

• At the recent meeting of Calif. District Council No. 2 it was announced that with the admission of San Luis Obispo Local 762 to membership, the Council now has a 100% membership of all projectionist Locals in California extending from Bakersfield and San Luis Obispo in the North, down to the Mexican border. In addition to theater Tv, many other pertinent topics were discussed at the meeting—in particular, the two-man situation. All the Locals were in accord that any attempted reduction in manpower in the Council's jurisdiction would be bitterly contested and that wherever and whenever an increase in wages was justified, they would cooperate with one another.

At the close of the meeting, Long Beach Local 521 entertained the delegates at Vivian Laird's Cafe in Long Beach. The next quarterly meeting will be held in February, at which time the Council members will be the guests of Roy Brewer, IA West Coast representative.

• Having long considered Arthur A. Smet, member of Local 195, Manchester, N. H., a confirmed bachelor, we were astonished when he sent us a note recently announcing his forthcoming marriage to "the finest girl in the world." According to Arthur's note, he and his bride will spend their honeymoon in Florida, spending a few days in New York en route. Our very best wishes to the happy couple.

WORKING FOR UNCLE SAM & *YOU*

Film men in the New Haven, Conn. area (never heard of Yale?) intensify the drive for collecting carbon-copper drippings. John E. C. Kelley, president of IA Local 273; W. Gillespie McIlwain, manager of National Theatre Supply branch, and Raymond J. Wylie, Variety Club Tent 31, check incoming copper drippings receipts.

WILLIAM P. COVERT

William P. Covert, second vice-president of the I.A.T.S.E. & M.P.M.O.U., died January 9 in Toronto, Canada, his home city. He had been ill with a heart condition last year, but he appeared to have made a good recovery, until he was stricken again last November.

Bill Covert had been a motion picture projectionist for more than 45 years, having started in 1906 when the projector and lamp were fastened to a table board and stood on four spindly metal legs. The film was run into a bag or a box, no magazines being available, with the show generally consisting of four short subjects for a total of about 1000 feet, plus an illustrated song. The admission price was five cents. The projectionist's wage was $6 weekly for a 10-hour day.

In 1909 a few stalwart Canadians decided to do something about the situation, and after a number of organization meetings 22 men were chartered on Nov. 17, 1909, as Local 173 of the IA. It required a general strike three years later, in 1912, for the Local to gain employer recognition.

The late WILLIAM P. COVERT

IA Official For 35 Years

Covert was a charter member of Local 173 and had served it as chairman of the board of trustees, vice-president, president, and business representative having held the last post continuously since 1917. He became a vice-president of the IA in 1917 when Canadian Locals were given representation on the General Executive Board, and he served continuously thereon since that time. In 1949 he was a Canadian Government representative at the convention of the International Labor Organization in Geneva, Switzerland.

Funeral services were held in Bayview, Ontario and were attended by many business and labor leaders, including International President Richard Walsh and other IA officials.

Bill is survived by his wife, Evelyn, and his children Valeria, Yildid, Julianna, Edward, Theodore, and Blaine, and his grandchildren Mary Ellen, Lynnanne, Peter, Jimmy and Pamela, all of Toronto.

Pat Travers, known intimately to all throughout the Dominion and generally throughout the IA, is now acting business representative of Local 173.

• To the best of our knowledge, the only motion picture theater in New York City closed on Christmas Day was the Newsreel Theater in the Grand Central Terminal. The management of this theater has always insisted upon declaring this day a holiday for its employes. Christmas is essentially an "at home" day—even for us year-round walled-in dwellers.

• Frank E. Cawley, 64, member of Local 450, Mason City, Iowa, died suddenly several weeks ago. Frank was a charter member of Local 450 in which he had held nearly every office, and was recently awarded an honorary life membership in the organization. For the past 42 years, he had worked as a projectionist in Mason City theaters and was extremely well liked by his fellow-workers.

Frank is survived by his wife, a daughter, two sons, nine grandchildren and two great-grandchildren.

• A representative crowd gathered to witness the installation of the newly-elected officers of the 25-30 Club—Edward Dougherty (member of Local 384, Hudson County, N. J.), president; John Krulish (National Theater Supply Co.), vice-president; Ben J. Stern, financial secretary-treasurer; Morris I. Klapholz, recording-corresponding secretary; Joseph H. Perlman, trustee for three years, and Julius Wetzler, sergeant-at-arms. All officers, with the exception of Dougherty, are members of New York Local 306.

Distinguished Audience

Among the invited guests were Admiral (USN, retired) Tomkins and Arthur Meyer, president and vice-president, respectively, of International Projector Corp.; Allen Smith, New York City branch manager for National Theater Supply Co., and Nat Golden, chief of the Motion Picture and Photographic Division of the National Production Authority of Washington, D. C., and a life member of Cleveland Local 160, his home town. During World War II, Allen Smith held a post in Washington similar to Golden's present one. They had quite a time comparing notes.

For Uncle Sam—& *YOU*

SAVE EVERY OUNCE OF COPPER

From the Production Front

Filming 'Quo Vadis' in Italy

A recounting of some of the technicol problems thot beset the camera crew in filming the biggest U. S. production ever mode in a foreign country, os reported in *American Cinematographer* (Oct. and Nov. issues, 1951). A technologicol mosterpiece.

By ROBERT L. SURTEES, A.S.C.

EVER since M-G-M made "Ben Hur," its most successful picture, back in 1924, the studio had sought another and equally powerful story with a religious background. After a prolonged search, it was decided, about 1935, to film "Quo Vadis"—in Italy. Research and preparation work was started immediately and when we entered World War II, M-G-M writers were still working on an acceptable motion picture treatment.

After the war, it was decided to postpone the production for another two years to permit studio executives to go to Italy and arrange for studio space and to survey the numerous production problems which shortage of equipment and facilities in Italy presented.

Shooting an extensive tracking shot in which 10,000 extros were employed. This set, representing exterior of Nero's poloce, wos lorgest constructed for the production. Steel tower, visible at upper right, was erected for making high angle shots.

It was decided to produce "Quo Vadis" in Rome, the actual locale of the historical novel. The Cinecitta Studio, located eight miles from Rome, was leased, and plans made for reconditioning it.

Mussolini, in 1936, had erected Cinecitta as his answer to Hollywood's supremacy in the world film market. During the war it had been allowed to fall into disrepair, then subsequently was converted to various uses—a factory producing war materials, a barracks for German troops, *etc.* It also had suffered considerably from bombing and machine-gunning by the Allies.

Stupendous Advance Preparation

Three technicians from Hollywood assisted in the reclamation of Cinecitta and prepared for the production of "Quo Vadis"—art director William Horning, costume designer Herschel McCoy and set director Hugh Hunt. The tremendous undertaking that faced them required two years of hard work before a single camera started turning!

Equally difficult preparations were being made back at the Culver City studio. Assigned to head the production were Sam Zimbalist, producer, and Mervyn LeRoy, director. Script writers John Lee and Hugh Gray, meanwhile continued whipping the story into shape. During the 1949 Christmas holidays, members of the M-G-M staff in Rome were returned temporarily to Hollywood for a rest.

Meantime, extensive casting tests were being made and these culminated in the selection of Robert Taylor and Deborah Kerr for the choice roles of Marcus Vinicius and Ligia. Other great names—many from the European theater—were added to the cast.

In April, 1950, came the signal that started actual production. I had just completed the photography of "King Solomon's Mines," and within a week John Schmitz, my camera operator, and I were flying the Atlantic, bound for Rome and Cinecitta.

Cinecitta at First Blush

The morning following our arrival in Rome, we drove to the Cinecitta for a first-hand study of the photographic problems that lay before us. I was astounded by the immense amount of work that had gone into the preparation for the production. Never before had I seen such large and beautiful settings for any picture.

Art director Horning had accomplished wonders in the face of tremendous handicaps and the difficulties of inexperienced Italian labor. Horning, without experienced construction men, had to supervise the driving of virtually every nail and every stroke of every paint brush

(*Continued on page* 27)

TELECASTS

Compatibility: Color Tv Tubes on the Rampage

EMPHASIZING the oft-repeated advice of IP to exercise extreme caution in lending acceptance to "revolutionary" new color Tv developments* is the appearance in the October, 1951, issue of the Proceedings of the Institute of Radio Engineers of *eleven* papers which describe *five* different types of tri-color Tv tubes, each of which is capable of operating on all known Tv systems, including the RCA compatible all-electronic system, as well as the field sequential method and standard black-and-white.

The five prototypes of tubes developed by RCA include those employing viewing screens formed of color phosphors arranged in patterns of dots, lines and checkerboard. Although the dot structure has been adopted for the tri-color tube now used experimentally in the RCA compatible color Tv system, other designs can incorporate any one of the several screen textures or a variation of them, without affecting the system.

Compatibility Not Inherent in Tube

"A tri-color tube," said Dr. E. W. Engstrom of RCA Labs, "is the keystone to a successful color Tv receiver. But no color tube by itself affects compatibility—that is, the ability of a standard black-and-white receiver to get color broadcasts in black-and-white. This is a quality which must be inherent in the color Tv system itself. The RCA color Tv system." he emphasized, "is completely compatible."

The tri-color tube now in pilot-plant production at RCA is a three-gun tube for either simultaneous presentation of the three primary colors—green, red and blue—as in the RCA system, or sequential presentation of the same colors.

'Painting' a Phosphor Screen

This tube comprises a glass plate and a metal shadow mask. On the plate are 600,000 small, closely-spaced phosphor dots, each .014 inch in diameter, arranged in triangular groups. Each group consists of three dots which glow in the three primary colors—red, green, blue—when hit by the scanning electron beam.

Behind the phosphor dot plate is the shadow mask. This is a thin metal sheet perforated with 200,000 tiny holes, and acts as a mask so that each electron beam as it scans can "see" only one dot of each color group. In the neck of the picture tube are three electron guns. These generate the beams of electrons which "paint" the color pictures on the phosphor plate.

The other four tri-color picture tubes described in the papers are basically similar in that the color is created by the action of electron beams on color phosphors.

* * *

Scouts The 'Vested Right' of Home Tv Setowners

MUCH has been printed and spoken about the "vested right" of home Tv set-owners to view, for free, any program that is broadcast, and particularly those programs of sporting events. The theory of this group is that such "rights" were "implicit" in the sale of the Tv set. Moving into the picture was a group of professional do-gooders (mostly lawyers and legislators) who grasped the opportunity to make capital of one sort or another.

For the edification of the aforementioned groups, we present here the opinion of a leading New York attorney who, in a letter to the *Film Daily*, relates not what he *thinks* but what he has *done*.

Law is Well Settled

Regarding the controversy raging about the omission to televise or broadcast prize fights and other sporting events.

The law on this subject is well settled. In 1931 I represented the Milk Fund of Mrs. William Randolph Hearst, the Dodger Athletic Club, "Mickey" Walker, and Jack Sharkey in a suit against Pathe News and RKO to enjoin the taking and showing of newsreel shots of the fight in competition with the official pictures of the fight, which had been granted to a motion picture company.

Promoter's 'Property Right'

The defendants argued that the boxing match was a public event and that the newsreels could report it in the same manner as the newspapers. They also argued that a prize fight could not be copyrighted, the result being unknown in advance, and therefore the official films themselves were not entitled to copyright protection.

I argued that a prize fight was a private event which created wide public interest, but nevertheless was a private enterprise in which the promoter employed the fighters, leased the arena, erected Klieg lights, and otherwise took the risks of a business operation; that therefore the promoter was entitled to grant or withhold such rights in his own discretion; that a prize fight created a "property right" for the promoter and that he could not be forced to part with it without his consent.

That case, known as Mayer v. Pathe, resulted in a decision in the Supreme Court (N. Y.) by Mr. Justice Carewe granting the injunction and upholding our contentions. The injunction was unanimously affirmed by the Appellate Division, and that case has been followed as a leading decision on the subject.

The demands for Congressional investigations are therefore meaningless. No power exists in Congress to deprive anyone of his property without due process of law, and any legislation tending to compel a boxing promoter to yield up his rights against his will would, in my opinion, be unconstitutional. EMIL K. ELLIS

* * *

Decision Against Football Clubs

First blood in the restricted-area Tv broadcast anti-trust suit brought by the U. S. Dept. of Justice against the National Professional Football League was drawn by the former when it successfully resisted a motion by the defendant to dismiss the case. This is regarded as a bad omen for exclusive theatre Tv showings, which might possibly face the same sort of action.

The football league argued that regulation of the telecasting and broadcasting of NFL games in "home" areas was vital to the very existence of the league. The moot question as to the general public's "right" to see and hear any and all broadcasts, which some people claim was "inherent" in the purchase of their Tv sets no less than because of FCC's license to broadcasters, is discussed in detail in another item in this section which presents the views of Emil K. Ellis, noted N. Y. City attorney.

* * *

Special Tv Glasses Now Ready

Special eyeglasses ("Tele-Bans") for Tv fans who complain of discomfort due to Tv glare are now available throughout the U. S., the Bausch & Lomb Optical Co., makers, has announced. Introduced

* "Telecasts"; IP for Oct., 1951, p. 20.

several months ago and tested since then by thousands of Tv set owners, the glasses are said to "permit all-evening viewing . . . minimize Tv glare and eye weariness . . . provide softer, more human pictures, even when sets are turned up bright. . . ." The glass is precision-ground and polished to the same quality standards as the finest corrective eyeglass lenses.

Research specialists at B. & L. emphasize, however, that Tele-Bans are not intended to remedy visual defects such as near-sightedness or astigmatism, which are disclosed only through an eye examination. Moreover, they agree with leading ophthalmic practitioners that viewing Tv is not, in itself, harmful to the eyes.

[Ed.'s Note: Accepting the last sentence as fact, it would seem pertinent to ask why, then, is a Tv viewing glass necessary.]

* * *

FCC Theater Tv Hearings Feb. 25

The National Exhibitors Theatre Television Committee will be permitted to appear at the theatre Tv hearings before the FCC on Feb. 25 next, the Commission has announced.

Oscar Oldknow, N.T.S. Official

Oscar S. Oldknow, 52, executive vice-president of National Theatre Supply Co. with headquarters in Los Angeles, died on Dec. 26 last following a cerebral hemorrhage. Mr. Oldknow, a native of Atlanta, Ga., was the son of the late William H. Oldknow, a pioneer Georgia film executive.

Entering the industry in 1920 in the state-right film release field, Oscar Oldknow in 1926 joined National Theatre Supply Co. as vice-president in charge of the western and southern territories. Except for a brief period with Fox West Coast Theatres, he remained with NTS until the time of his death. Mr. Oldknow also held extensive theatre interests in Georgia, Florida and Alabama, and he was president of the East Point Amusement Co., of Atlanta.

He is survived by his wife and his son, William H., who is an official of a drive-in theatre circuit.

Carl Weber, Soundfilm Pioneer

Carl M. Weber, president of Weber Machine Corp., Rochester, N. Y., died at his home in that city of Dec. 18 last. Mr. Weber was one of the pioneer soundfilm men, his firm having started in the late 1920's to build and distribute reproducing systems for theatres under the trade name of Syncrofilm. Other units were added to the line from time to time so as to round out the theatre manufacturing and sales program.

IA ELECTIONS

LOCAL 171, PITTSBURGH, PENNA.

Paul P. Mach, *pres.;* Luther Thompson, *sec.-treas.;* James V. Sipe, *bus. rep.;* Danny Flask, LeRoy A. McConnell, Ralph T. Freeman, *exec. board;* Michael J. Gardner, James O. Caskey, Clyde Cain, *trustees;* Angelo Diodati, *sgt.-at-arms;* John J. Nickel, Henry W. Link, Jr., *del. Union Label Council;* P. Mach, J. W. Sharkey, D. Flask, Sr., *del. IA convention;* Kenneth A. McGuire, *del. Tri-State Convention.*

LOCAL 306, NEW YORK CITY

Herman Gelber, *pres.;* Al Kunze, *vice-pres.;* Ernie Lang, *rec.-sec.;* Izzy Schwartz, *fin.-sec.;* Abe Kessler, *treas.;* Steve D'Inzillo, *N. Y. bus. rep.;* Harry Garfman, *B'klyn bus. rep.;* Herman Stoller, *sgt.-at-arms;* Al Ashkinos, Herman Boritz, Wm. DeSena, Chas. F. Eichhorn, Frank J. Inciardi, Max Kessler, Frank E. Miller, Sam Salvino, Eddie Stewart, Barney Weiner, *exec. board;* James Ambrosio, Ben Stern, Frank Verno, *trustees;* Max Aidikoff, Alex Becker, Artie Klein, Max Rosenberg, Phil Shafran, *sick comm.;* Joe Abrams, Mike Berkowitz, Nat Doragoff, M. I. Klapholz, Dave Narcey, *retirement board.* The following were elected *delegates to the forthcoming IA Convention:* J. Abrams, J. Ambrosio, Al Ashkinos, Jos. D. Basson, H. Boritz, Dick Cancellare, S. D'Inzillo, N. Doragoff, C. Eichhorn, H. Garfman, H. Gelber, F. J. Inciardi, A. Kunze, E. Lang, F. E. Miller, M. Rosenberg, Tony Rugino, Wm. Salke, I. Schwartz, A. Silverman, Mike Springer, E. Stewart, H. E. Storin.

LOCAL 376, SYRACUSE, N. Y.

Louis R. Boyd, *pres.;* Francis J. Miller, *vice-pres.;* George F. Raaflaub, *sec.;* Lionel B. Wilcox, *fin. sec.-treas.;* Walter Scarfe, *bus. rep.;* Lawrence F. Sherman, Harry C. Burley, *exec. board;* Russell Stevens, Charles R. Nelson, Leonard Tondeur, *trustees;* George E. Doss, *sgt.-at-arms;* William H. Maxon, *del, Central Body.*

LOCAL 407, SAN ANTONIO, TEX.

Walter R. Tinney, Sr., *pres.*; Alfred Pena, *vice-pres.*; Henry L. Villapadiernia, *fin. sec.*; Horace E. Blanton, *rec. sec.*; William Burr Keeler, *bus. rep.*; Manuel Ayala, Phillip N. Wehrmann, *del. at large.*

LOCAL 444, NEW KENSINGTON AND TARENTUM, PENNA.

Philip "Blacky" Bordonaro, *pres.;* Walter Austin, *vice-pres.;* Charles Wolfe, *treas.;* F. P. "Reel" McCoy, *sec.;* Joseph J. McClosky, *bus. rep.;* Howard Wolfe, Ralph Milbarger, Joseph Mickelic, *trustees.*

LOCAL 521, LONG BEACH, CALIF.

"Mike" V. G. Martz, *pres.*; Marvel Fairchild, *vice-pres.*; Alonzo Bennett, *sec.*; Ralph E. Addy, *treas.*; G. A. Lahlum, *bus. rep.*; Ward R. LaBar, Clyde Jones, LeRoy A. Ward, Joseph V. Tracy, V. G. Martz, M. Fairchild, A. Bennett, *exec. board*; Roy T. Heckman, Jack N. Ward, C. E. Leyman, Jr., *board of trustees*; N. D. Owens, A. Bennett, R. E. Addy, *board of exam.*; L. D. Sisson, *sgt.-at-arms.*

LOCAL 546, LOWELL, MASS.

Laurence A. Hadden, *pres.*; Sidney E. LeBow, *vice-pres.*; Sidney C. Barton, *sec.-treas.*; S. E. LeBow, *bus. rep.*; L. A. Hadden, S. E. LeBow, S. C. Barton, Stephen J. Marchacos, Oscar J. Schwartz, *exec. board*; R. C. Gray, J. Roland Lizotte, Wm. J. Petren, *del. Lowell CLU*; S. LeBow, *del. IA Convention.*

LOCAL 650, WESTCHESTER CO., N. Y.

Patsy Colarusso, *pres.*; Anthony Dente, *1st vice-pres.*; I. A. Weiss, *2nd vice-pres.*; Albert Storch, *3rd vice-pres.*; Michael J. Nugent, *sec.*; Joe Schappach, *fin. sec.-treas.*; Fred "Frenchy" Thome, *bus. rep.*; Albert E. Bell, Donato De Palo, *trustees*; Colarusso, Dente, Weiss, Storch, Nugent, Schappach, Thome, Bell, DePalo, *exec. board.*

For Uncle Sam—& *YOU*

SAVE EVERY OUNCE OF COPPER

Film Employer Exploited Blind

Fines totaling $7,500 and a sentence of 1 year and a day in jail were the penalties passed upon Morris Kleinerman and the Ideal Film and Supply Co. of N. Y. City in the U. S. District Court for filing false affidavits for overtime pay due to blind workers under the Federal Wage and Hour Law. Kleinerman, secretary of the company, was sentenced to a year and a day and fined $2,500. He was committed without bail. Of the $5,000 fine levied against the corporation, $3,000 will be remitted if restitution for the overtime pay of $2,038.96 is paid to 26 employees, 14 of whom are blind, within 10 days, the court ordered.

A grand jury previously had indicted Kleinerman for claiming he had reimbursed his employees for overtime found due by investigators. Employees testified receipts submitted by Kleinerman had been secured by trickery. The blind workers were unaware back wages were due them, and signed receipts in blank; the amounts due were filled in by Kleinerman before he submitted the receipts.

"Humanitarian" Role Citation

Kleinerman, cited as a humanitarian for offering jobs to blind workers, used them, the blind employees stated to the court, because they could process up to 1,600 rolls of film per day as against an average of 1,200 processed by a sighted worker. Kleinerman's film agencies had been found to be violating Wage and Hour laws on four other occasions since 1943, and persistently falsified wage records and refused to pay time and one-half for overtime work.

Six-Story Mixing Machine

A stainless steel unit six stories high has been installed at Eastman Kodak Co. for the continuous mixing of fixing salts. From two to five chemicals, depending on the formula used, are started on their way on the top floor, weighed in continuous automatic machines on the fifth floor level, and blended in two mixers on the fourth floor. Farther down two more chemicals are added.

From storage bins on the second floor the completed and tested mixture passes to the filling machines on the ground floor.

AMOS KANAGA (W 6 B A A) BROADCASTS AGAIN

IA Guy—San Mateo, California

ONE of the major thrills of reading IP has been a gander at the IA-IP amateur radio "ham" listing, which has now swollen to a full page. We're not receptive to that old malarkey about "little acorns," because our big beef is that the listing doesn't appear often enough. We know—type, ink and paper, and all that sort of thing.

We remember the fumbling beginnings of this listing when only a few of the boys were cooperative enough to pitch in and grease the ways for the gang to follow. For this, due thanks to the IP mugs and to every one of the guys throughout this dear old hemisphere who contributed even a single listing to this grand fraternal roundup.

Within our own we're gilt-edged, and although the QSO's are a bit difficult they pay off in fraternal spirit. And you should hear *the stuff* that goes on! Don't worry, we're in good standing with those regulatory fellows.

Mondays From 9 to 11 A.M.

This savvy W 2 C Y Q (Frank Larham, 200 Washington St., B.A. of Local 108, Geneva, N. Y.) suggested a *definite time* when we otherwise sane IA guys could chew over things. Frank has an idea: we suggest each Monday from 9 to 11 a. m., Pacific Standard Time, working on around 27,800. (Ed.'s Note: Those West Coast fops: the Pilgrims did *not* land in California on P.C.T.).

Personally, we'll try to be on at 10 a. m. each Monday; and quite a few of the boys have promised to be on the beam.

Don't Forget: If you contact an IA guy, shoot a card to us and give us the low-down. Don't be afraid to break in on a QSO—we'll have a multi-section gab. It's not absolutely necessary to be on 28,700: this is just our calling frequency—we may be QRM'd at any time. Tune around a bit, and we'll wager that you'll be rewarded.

As for those IP magazine mugs, we can put them to shame by expanding their listing—and their printing bills. Let's do it.

Amos Kanaga—W 6 B A A
262 La Casa Ave., San Mateo, Calif.

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VE7ACB	F. J. McGuire	L. 680

[NOTE: Additions and corrections should be sent to AMOS R. KANAGA (W6BAA), 262 La Casa Ave., San Mateo, Calif.]

Adjustable Maskless Screen

By KEN CALDWELL
IA Local 233, Buffalo, N. Y.

NOVELTY has always been an important factor in show business, but the vision and imagination which results in novelty evidently has long been absent from the motion picture exhibition field.

Just because motion picture screens have for years been surrounded with black masking does not mean that they should always employ such a surround. The maskless screen has been employed in several U. S. theaters within recent years, and they have been most acceptable to the audience, with no unfavorable reaction as to their effect upon the human eye.

Such screens, however, have been employed in a more or less static form, with no provision being made for occasional change in terms of the surround. My thought is that the surround effect should be varied from time to time both in color and tempo so as to complement the type of picture shown. Proper lighting effects is the answer. I have devised such an effect.

Basic Principle of Effect

The basic principle of this effect is for the projected picture to "spill over" the screen on all four sides onto baffles which are positioned 18 inches to the rear. This will eliminate fuzzy edges to the picture, and the effect will give the impression of the picture hanging in space, so to speak, this impression being conveyed by the different shades of color on the baffles. The blending of the projected picture into the soft hues of light set at a different plane from that of the screen will create a most pleasing effect, one that will be entirely acceptable to the human eye.

I have no fixed idea as to the particular colors to use on the baffles, but a little experimentation in a given theater will undoubtedly be productive of the correct answer. Most theaters have attractive scenery surrounding the screen which cannot be seen when the show is on. My idea is that all this scenery could be gently illuminated and the entire stage area made dimly visible during the projection of the picture.

The light baffles may be made from inexpensive beaver board with light wooden frames behind them to provide rigidity; the lighting troughs may be made from ordinary O. G. gutter pipe. The degree of intensity of light on the baffles is a matter for experimentation and determination after the installation is made.

National Theater Screen Refinishing Co.
129 Zenner St., Buffalo 11, N. Y.

[NOTE: The foregoing was accompanied by a blueprint which gives detailed instructions for the construction, installation and operation of such a screen surround, but unfortunately the print was unsuitable for reproduction herein. A copy of the print and other data are available from Mr. Caldwell for the asking.—ED.]

B. & L.'s Movie Lens Comparator

A device that enables camera fans to look through various types of movie lenses and actually see the picture they would get with a particular lens has been developed by Bausch & Lomb. Known as the Animar Lens Demonstrator, the unique optical instrument is similar in design to a simple telescope, with the addition of a revolving turret that accommodates three 8-mm or 16-mm lenses at a time. By focusing on any subject, and revolving the turret from lens to lens, one can see in a matter of seconds how a telephoto lens, for example, will give a different picture from a wide-angle lens. Similar "look-see" comparisons may be made of a high-speed lens and a "normal" lens.

Lens Performance Fundamentals

At the same time, the intriguing 10-second tests which are presented in a booklet accompanying the instrument afford valuable pointers on such things as field coverage, magnification, depth of field, filter effects, the effect of lens stops on exposure,

and other lens performance fundamentals.

Several hundred demonstrators, which may be mounted on a standard movie camera tripod or held in the hand, have been produced for leading camera and lens dealers in the U. S., and will "eliminate much of the mystery of technical terminology previously required to explain various lens performance features to the average moviemaker."

Lightweight Film Containers?

Some form of lightweight film container to replace the heavy type now used is the topic of a bulletin by the N. Y. area office of the Theatre Owners of America. The bulletin is based on the views of a Texas exhibitor, who stated in part:

"Rounding out 30 years in this business, I note that film carrying containers today are identical to the ones used in 1922. In the last 18 months we know how largely the industry's print situation has been changed to acetate-non-inflammable stock. Why, then, the continued use of unnecessary heavy cans in view of the miracles of modern scientific development of plastics, veneers, and many lightweight metals?

"A varying transportation saving of 33 1/3 to 40% is possible to theatre owners on single and two-reel subjects—and a considerable saving on larger shipments—not at all a small item to small town theatres which are today paying $100 and upward each month on 200-mile hauls—and more as exchange distance increases.

Public Relations Fodder

The following exposition on the motion picture, an eloquent one, is an excerpt from a Movietime USA speech by Joyce O'Hara, of the Motion Picture Assoc. of America. It is offered as food for thought to those who may be called upon at various times to say a few words about their industry.—Ed.

To me, this is a warm and glowing hour in a half-century of motion picture progress. The whole history of this period is just as dramatic as any of the great epics that ever came out of Hollywood.

Before Tom Talley opened the first theatre in Los Angeles, the motion picture was squeezed in between the tattoo artist and the flea circus in the penny arcades. Today, it's invited to the White House, and it plays command performances at the Court of St. James.

Marriage With Music

The motion picture was born mute. But it compensated for that handicap by teaming up with music at an early age. In the teen ages of this century, the piano thumper was a fixture in our motion picture houses. He gave way to full-scale orchestras, and in the early twenties the motion picture theatre doubled in brass as a music hall.

Then the film discovered the use of its own vocal chords, and it posted the banns for a permanent marriage with music. The marriage has prospered and blossomed. Today's motion picture is a dramatic production and a symphony concert for the price of one ticket.

And I ask you, where could you get a better bargain?

For Uncle Sam—*& YOU*

SAVE EVERY OUNCE OF COPPER

PERSONAL NOTES

Dr. C. E. Kenneth Mees, vice-president in charge of research for Eastman Kodak Co. and a world authority on photography, completed 40 years of service with the company this month (January, 1952). He is the author of some 150 publications, including more than 100 scientific papers and several books.

W. Allen Taft, former assistant manager of the Parlin, N. J., plant of the Du Pont Photo Products Dept., has been named assistant district manager of the department's Chicago sales office. Robert K. Perrine is the manager.

Hollis D. Bradbury has been advanced from Eastern to National manager of RCA film recording sales. A field service engineer from 1930-37, he has been with RCA for 24 years. Everett Miller replaces Bradbury. Both will headquarter at 411 Fifth Ave., N. Y. City.

FILMING 'QUO VADIS'

(*Continued from page* 20)

in the hands of willing but untutored Italian workers. It had been a feverish day-and-night job, and the cost item was just as important as though we were making a "B" picture, instead of the most expensive motion picture ever produced.

Two unpleasant surprises were mine upon viewing our sets that morning. First, it would be impossible to use overhead light platforms. The stages, walls and ceilings were in such bad repair that they would never be able to hold the weight of heavy arc lighting equipment. This meant that all light decks would have to be supported from the floor. Then, as a matter of course, it followed that none of the set walls could be made "wild," because they, too, would have to help support my equipment.

A Roofless Studio

The second surprise was the set for the Roman banquet scene. This setting was so vast that none of the regular Cinecitta stages was large enough to contain it. Also, we did not have enough lighting equipment to properly illuminate it for Technicolor.

As a last resort, art director Horning had the set constructed on Cinecitta's stage 15, which consisted of four walls and no overhead roof whatsoever—the war had interrupted its completion. But the situation had its good side, too. It enabled us later to augment the illumination of the vast set with sunlight.

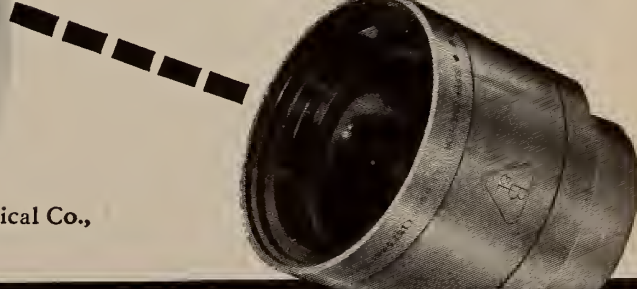
A year earlier, John Arnold, M-G-M's executive director of photography, had made extensive tests with this type of lighting, and the net result of his findings was of vast help to us later when lighting and photographing Nero's banquet scenes.

I added one or two innovations to their system, however, which made it possible to maintain greater control of the sunlight falling on the roofless stage. We stretched two sets of diffusers overhead, one atop the other, so that, with the aid of about 30 men pulling on ropes, we could vary the amount of light falling on the set. We found that "wild" light alone would measure about 400 foot-candles, which was about twice that needed to supplement the illumination from our artificial lighting equipment. Thus, by varying the density of the overhead diffusers, as the sun rose and then gradually descended toward the close of day, it was possible to maintain a fairly consistent value of 200 foot-candles in the daylight falling on the set.

Night-Scene Requisites

When it came time to film the night interior extreme effect sequence on this stage, again we found there was too much daylight splashing about on our set. This was especially true on the top of the walls, where the diffusers spilled most of the light from the outside. To correct this, Horning had the topmost part of the walls painted a darker tone; we also eliminated one diffuser, dyed the one remaining a deep blue-grey color, and resumed shooting.

This worked great until a day or so later when a rainstorm occurred, causing unsightly streaks of blue dye from the rain-drenched diffusers to mar the set walls. Also damaged was much of the furnishings and expensive draperies. Thus, Nero's banquet set goes down in



my book as the first *interior* I ever worked on where we photographed, "weather permitting!"

Horning had his problems in set construction, too. The lumber shortage in Italy, lack of skilled woodworkers, and the tendency of the limited lumber stocks to warp, all contributed to making his already enormous task an extremely tough one. The warping of wooden floors was remedied by substituting cement for wood. But the problem continued in the construction of the vast Arena set, made to seat more people than Los Angeles' Gilmore stadium, and in the construction of the gigantic bridge, over which 5,000 people were to be filmed as they made their way across it in their escape from burning Rome.

Unusual Camera Angles

The exterior of Nero's Palace was an immense set capable of holding a crowd of 10,000 extras. The forecourt was cement, beautifully decorated to simulate mosaic. Six 50-foot statues of various Roman Gods were erected on pedestals on the raised platform. The colors of the building and the mosaic designs in the forecourt all had been selected with an eye toward blending satisfactorily with the costumes of the players. At the rear, overlooking the set, a 100-foot steel construction tower was erected, which we used for making elevation shots with the camera.

These and other unusual camera angles had been charted and agreed upon during the various set design meetings held earlier in Hollywood. The perspective drawings made by Cedric Gibbon's art department were used as a guide whenever lining up our camera setups. We were not required to follow these implicitly, which permitted us the latitude of watching for and utilizing improved camera angles, where possible. We were ever alert for making improvements over our basic plans.

Edward Carfagno joined Horning later to assist him with his task of set construction supervision. Here mention must be made of what was probably the art department's most outstanding contribution—the construction of an entire Roman street, complete with homes and shops of 2000 years ago. Other construction accomplishments included the building of 100 additional interior sets, which required the services of 500 carpenters for a period of more than two years. Sculptors took over one complete sound stage where they designed and moulded more than 500 pieces of statuary used in decorating the sets.

A Vast Costuming Job

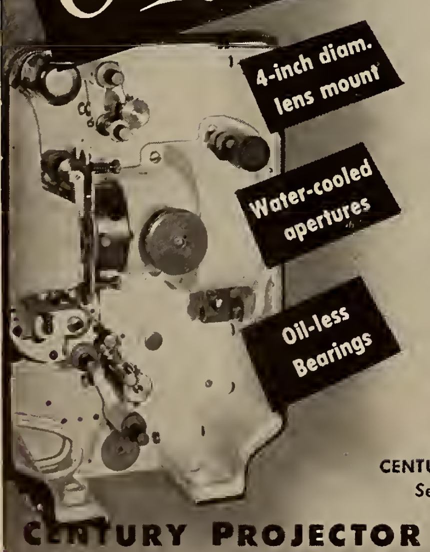
Costuming was a major undertaking. Designer Herschel McCoy and his staff were continually swamped with work in making costumes. This required the utilization of still another of Cinecitta's sound stages for the manufacture and storage of costumes. Another stage was divided into sections where a dry-cleaning plant, a laundry and a shoe-repair shop were set up.

So vast was the costuming job, McCoy sought outside assistance in making the costumes; but there were not enough companies in all Italy capable of turning out the tremendous number of costumes the production required. McCoy finally contracted much of the work through agents who parcelled it out among housewives in and around Rome. The combined project consumed more than 52,000 yards of materials, resulting in more than 32,000 costumes. Turned out by hand were more than 15,000 pairs of sandals, 12,000 items of jewelry, 4000 helmets of brass, aluminum and tin; 4,000 breastplates, 2,000 shields, and 21,700 water bottles.

Costume Color Contrasts

Novel shortcut methods were devised in the issuing and checking-in of costumes for the thousands of extras. When we worked the Arena set, 14,000 extras would have to be outfitted, and at the close of the day's work all wardrobes had to be turned in. During the night, these were cleaned, repairs made where necessary, and all made ready for use again the following day.

Besides the mechanics of issuing and retrieving costumes daily, McCoy's great-



er problem concerned the colors in the costumes. Here the technical requirements of the camera had to be considered as well as the pictorial composition of the photography.

The rushes were carefully studied each day to make sure we were not getting too many people in blue or red uniforms in clusters in the vast assemblages. To avoid the problem of too many red-dressed players grouping together inadvertently in a scene—which would create a strong distracting factor—the red costumes were dyed in various shades of red, so that there would be little likelihood of too much of any one color tone appearing in any one spot.

No one before ever had made a Technicolor feature production in Italy. Italian studios and sources of equipment therefore were unable to supply many of our needs. Before we could begin shooting, camera parallels had to be built, as did camera perambulators and tracks, reflectors (for which we had to send back to Hollywood for the silver leaf!) overhead scrims, *etc.* A "Council" camera crane and also a large boom, secured in New York, had arrived in bad shape due to a rough oversea crossing.

Technical Help Problem

The technical help problem proved to be a major headache, too. This is in no sense belittling the fine Italian, German, Arab and African men who have worked with me during the production of U. S. pictures made in their respective countries: these men have not had the same kind of training as our American technicians and therefore do not adapt themselves to our pace. That some of these foreign motion picture technicians are "catching on" was evident when I returned to Italy several months later to photograph "The Light Touch," also for M-G-M. I found the same Italian crew I had used on "Quo Vadis" a much improved outfit.

Adapting the Italian worker to our methods and integrating him with our own studio-trained men was greatly a matter of education. That became evident before we had progressed many days of shooting in "Quo Vadis." One of the first steps taken in this direction was our school for electricians conducted in Rome by Fenton Hamilton, my gaffer, and his assistant Frank Leonetti. Prior to our arrival in Rome, there had been only three arc lights in the entire Italian film industry, which explains why competent Italian operators of this type of equipment just weren't to be found.

Maze of Electrical Equipment

In addition to the large amount of lighting equipment M-G-M had shipped to Italy, the studio also sent over five large generators. Later, we borrowed an additional generator from the Italian government—one that had been removed from the decommissioned battleship "Vittoria Veneto"!

In the 250 tons of electrical equipment shipped to Italy from the U. S. were a score of "brutes," one hundred and fifty Seniors, and many other miscellaneous lamps—all equipped with the necessary cables, splicing boxes, *etc.* When all this was dumped on the Cinecitta lot, the Italian workers were completely amazed.

Cinecitta had previously been stripped clean of all electrical equipment, even to the wiring, by the German army, which accounts for the necessity of having to ship so much from America. On arrival, we found much of the U. S. equipment badly in need of repair, so roughly had it been handled on the ship, and in loading and unloading. But Hamilton and Leonetti soon had their students sufficiently organized and advanced in their training to tackle the job of getting the equipment in shape and the studio in order for its use.

Early Going Very Rough

The first few days of production in Rome were "rough." We were able to secure only three or four setups per day. Camera motors broke down; sound equipment blew; the Italian electricians, new to their jobs, allowed lamps to go out during takes. One tried trimming an arc lamp with the switch on! The shock he received taught his associates a lesson as well. Since the generators did not have voltage regulators, and thus had to be controlled manually, we ran into voltage fluctuations which drove us half crazy.

All this took place in spite of our precautions to check and double-check every piece of electrical equipment. We had even gone through "dress rehearsals" for several days before we started shooting, practicing lighting sets, *etc.* The sound department was having its troubles, too, and Bob Lee and his Italian engineer,

Piero Cavazutti, were to be seen running around with all sorts of meters and testing equipment, checking voltages, *etc.* Things got to be point where we technicians were, frankly, stopped.

If conditions looked bad to crew members, it must have looked absolutely devastating to the executives of the production staff. Things got so bad there were rumors of calling off the production and abandoning it. A general meeting was called in Rome, where some very helpful suggestions were made. It was felt that most of our trouble thus far was due to bad breaks; that Italian crewmen were developing rapidly in efficiency; and that our pace would materially increase with each day's work.

[To be Continued]

COMMUNICATIONS

To the Editor of IP:

Herewith a copy of a letter sent recently to the Academy of Motion Picture Arts & Sciences:

"I have been requested by my Local Union to send this letter. First, why in so many recent cases must the title and reel number be printed on the leader so microscopically small? Some producers may justly be ashamed of their product, but it also appears on some mighty fine product. Why hide behind that small 2 pt. type?

"Now, long title prints can have the *lead* title word in large type and the balance in smaller type. Still, the reel number should be easy to read, at least without a magnifying glass.

"Regarding leaders: The wide frame lines are fine up to the 3-foot mark, but beyond that to the head the SMALL frame lines, please. No matter how careful a projectionist may be, and especially on a fade-in, those large frame lines hit the patron in the face.

"Some companies are going along with us on the above, but *all* the outfits should."

AMOS KANAGA
Secretary, Local 409, San Mateo, Calif.

To the Editor of IP:

Our heartfelt thanks for your very kind permission to reprint from your journal those articles which have a particular bearing on practical projection procedures. The fact that this permission is extended *without charge*, to the betterment of our people, expresses, we think, the true spirit of American democracy—which has often been pictured in a different vein by other sources.

Our deep appreciation and gratitude for this sporting gesture.

INTERNATIONAL TALKIE EQUIPMENT, LTD.
Bombay 4, India.

To the Editor of IP:

On behalf not only of myself but other projectionists in this land so distant from America, I ask that you extend a cordial invitation for a mutual exchange of correspondence between ourselves and your American projectionists. We are particularly interested in examination questions and procedure, the union organization, and an exchange of thoughts on technical matters. Many thanks.

ARTHUR ZEHNGEBOTH
Zlil Theater, P.O. Box 96, Jaffa, Israel.

Phillips—the Carbon Saver Man

Thirty years in show business, with 20 of them having been spent on a projection job in one theatre, is the record of Homer L. Phillips, of Charleston, West Virginia, the manufacturer of the Phillips arclamp carbon saver. A member of IA Local 500, of Charleston, Phillips has been enjoying much success with the distribution of his line of carbon savers for all types of arclamps, particularly since the current materiels conservation program went into full swing.

Nearly all projectionists are inveterate tinkerers, although few of them follow through on a given unit to the manufacturing and merchandising stage. Phillips is an exception to this general procedure pattern. During the last war he doubled in brass, so to speak, with the Charleston Theatre Supply Co. Shortly after the war he equipped a small machine shop for the manufacture of carbon savers, and he has been at it ever since. Some 20 years ago, Phillips was one of the first to patent a seal ball bearing.

When Phillips tears himself away from his projection and shop work, he hies himself to his farm in Greenbrier County, W. Va., a spot to which he hopes to retire permanently in the not too distant future.

Captain
Lewis L. Millett
Medal of Honor

When his Infantry company was pinned down by heavy fire near Soam-Ni, Korea, Captain Millett charged alone into the enemy positions, throwing grenades, and clubbing and bayoneting the enemy. Inspired by his example, the attacking unit routed the Reds, who fled in wild disorder.

"It's an uphill struggle," says Captain Millett, "to build a working peace. Unfortunately, the only argument aggressors respect is *strength*. Fortunately we've learned this lesson in time.

"*You* can help build our strength—the defense-line of peace—by buying United States Defense Bonds. Every Bond is a declaration to the world—especially to would-be aggressors—that we aim to insure peace.

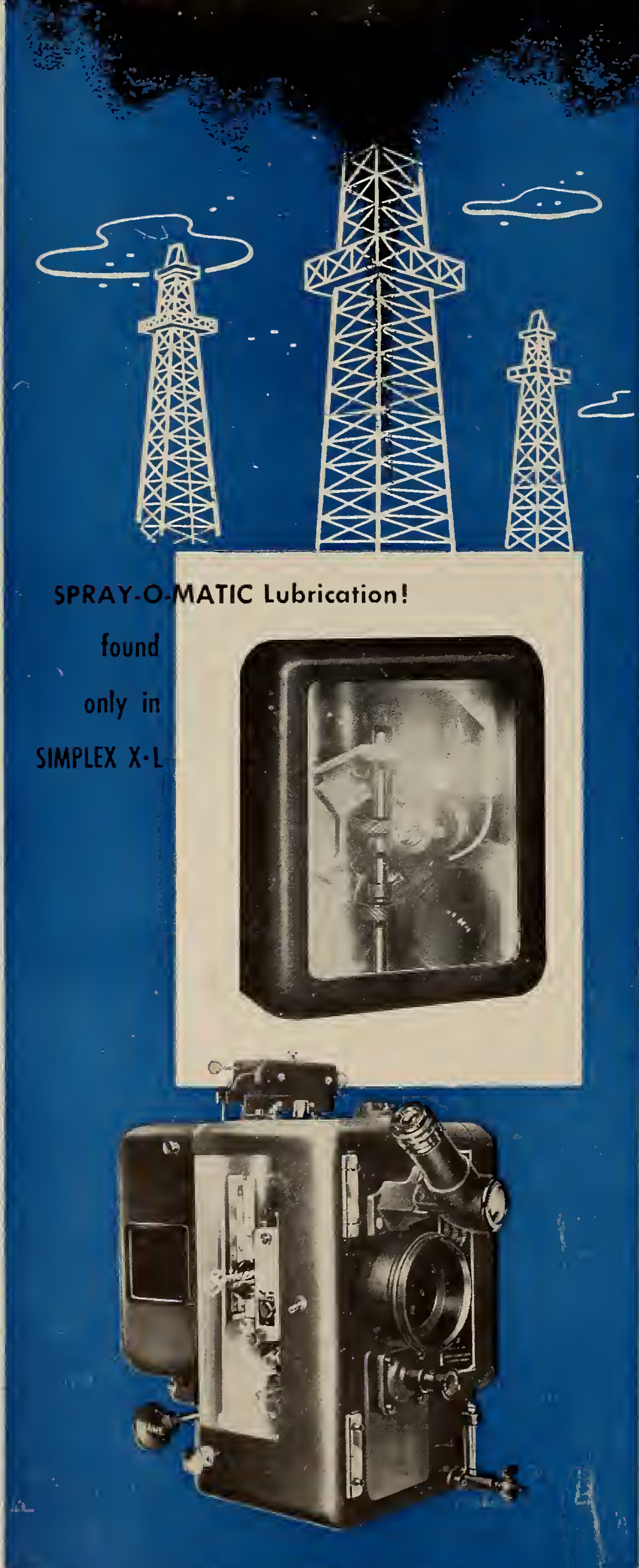
"I think a secure peace is worth working for. If you think so, too, buy U. S. Defense Bonds now!"

★ ★ ★

Remember that when you're buying bonds for national defense, you're also building a personal reserve of cash savings. Remember, too, that if you don't save *regularly*, you generally don't save at all. Money you take home usually is money spent. So sign up today in the Payroll Savings Plan where you work, or the Bond-A-Month Plan where you bank. For your country's security, and your own, buy United States Defense Bonds now!

Peace is for the strong...
Buy U. S. Defense Bonds now!

Fountain of Youth!



That transparent glass on the gear side of the SIMPLEX X•L is your private window on the *most ingenious lubrication system* ever devised in a projector mechanism!

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So efficient is SPRAY-O-MATIC Lubrication that not a drop of oil can reach the film. The oil remains *always* clean — the projector *always* young!

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Simplex
T. M. REG. U. S. PAT. OFF.

X•L

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INTERNATIONAL PROJECTIONIST

FEBRUARY 1952

VOLUME 27 • NUMBER 2

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With Which Is Combined PROJECTION ENGINEERING

JAMES J. FINN, *Editor*

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MONTHLY CHAT

IT WOULD seem that the period of uneasy ease in terms of a guaranteed income such as the $900,000 "take" *in one year* by Charles Skouras of Fox West Coast Theaters and the annual jaunts to Florida for two, three or more weeks each winter by exhibitors who are stony-broke (you should live so long) have come to an end. Really, the producers and exhibitors are finally exhibiting some concern about the source of their power and opulence.

For months we have been hammering away in this corner on the theme of the great necessity for the motion picture industry to have an independent research organization of its own. Oh, yes, there is the SMPTE and the Research Council of the Academy and the Conservation Department of the MPAA and various and sundry other units which have to do with improvement, maintenance, conservation and the like. But these bodies have to date been concerned primarily with conserving that which we *have*. Our concern is that which we *have not but should have*.

Sounding off before the recent meeting of the Theater Owners of America in Los Angeles was the eminent Dr. Lee A. Dubridge, president of the California Institute of Technology at Palo Alto, Calif. What the motion picture industry needs, said the Doctor, was an independent research organization which would enable the motion picture theater as operated today not only to withstand but to overcome the onslaughts of home Tv and other forms of competition. About $3 million was the Doctor's estimate of the amount needed to properly launch such an enterprise.

Well, we're all for this sort of up-and-doing, as recounted in this space on innumerable occasions. But we are also all for the laying off of the research set-up and personnel by the pawing hands of those who have thus far demonstrated only that they have sticky hands. It is no secret that the so-called executive brains of the motion picture industry wouldn't recognize a Bunsen burner if their Scotch was served in it—nor even a good film story unless it were recommended by their teen-age daughter on the basis of a casual contact with some vagrant genius whom they found lolling on the sand at Cannes.

If and when the all-industry research project is launched, the foremost requisite will be that of intellectual integrity on the part of the institute's staff. Sure, the end sought will and should have a distinct commercial flavor in that the motion picture industry shall enjoy economic health. But let's not have a scientific group subject to the grim and voracious appetites of the industry brass which has already inflicted irreparable damage upon a once-great industry.

Let's pray that the industry means business this time, and that the Palo Alto project gets unlimited support from all concerned.

INTERNATIONAL PROJECTIONIST

VOLUME XXVII FEBRUARY 1952 NUMBER 2

An Object Lesson in Film-Cooling

By ROBERT A. MITCHELL

THE problem of keeping both the projector film-gate and the film below uncomfortably, even dangerously, high temperatures has always been with us. Over here in the dear old U. S. A., that is. But it's old-hat in the Stuttgart (Germany) Zeiss-Ikon works where the Ernemann "cold" projectors are made.

Of course, it may be said that the inception of the drive-in theater with its tremendously large screen first directed the reluctant, but serious, attention of American projection circles to this pressing matter—after considerable prodding by the projection craft, mainly in the pages of IP. But, to repeat, the heat problem still is with us, and it has whiskers down to its knees.

Remember the 35-amp low-intensity mirror arc you were using 15 or 20 years ago? It was *hotter* than the simplified high-intensity lamp you are using today! And the 100-amp straight arcs which illumined Theda Bara's hand-cranked emoting in the good old days were erupting volcanos in comparison with the largest rotating-positive, high-intensity arcs now on the market. The low-intensity arcs did not give nearly as much light as the modern high-intensity arcs, but they produced more radiant energy per watt—and most of this energy was in the form of absolutely invisible infrared radiation which produces strong heating effects whenever it impinges upon film or almost anything else.

Larger Screens; H-I Focus

There is another point to be considered, too. Whereas the 30-foot indoor screens of yesteryear could be counted on one's fingers and toes, the comparatively huge outdoor screens of today are numbered by the thousands.

Besides increasing the sales of tannic acid and other burn remedies to projectionists who must thread up sizzlingly hot projectors, the present situation in regard to excessive densities of power being shot through the aperture poses a difficult problem to film distributors who dislike having their prints heat-blistered and hopelessly buckled after one playing engagement.

From the audience point of view, super-high projection causes a rapid flutter of the picture frames in the aperture, making perfect focus physically impossible. The audience point of view is always a good one to consider, because if theater movies become unpopular, we will find ourselves out of jobs.

Film-Cooling Adjuncts

All of us are aware that air blowers and water-cooled gate castings are now available for use with several American projectors. Not to mention the heat-filtering glasses. Be that as it may, a search for a projector having all these cooling means integrated by effective engineering would give us no cause to shout "eureka!"—unless, perchance, we invade the inner sanctum of some process projection studio and discover a tailor-made job created by a genius in the art of projection technology.

This is not to say that a single heat filter, or aperture blower, or water-cooled gate is not a good thing when used by itself without the others in proper coordination. Indeed, it most assuredly is. There is now not quite so much reason for investing in tannic acid or making for the projection-room door like mad whenever a sudden power failure causes a nitrate print to stop dead in its torrid tracks.

The irksome side of the matter is that all the world except America has enjoyed *all* cooling methods, superbly designed, for quite a number of years, notably in the German Ernemann models V and VIIB. And, to top it off, Ernemann produced about a year ago the Model X, which is the ultimate in cinematic Frigidaires. (Incidentally, the niceties of its operation are already included in the projectionist-training curricula of many European countries.)

Improvements of Long Standing

The Ernemann X, however, is best regarded as an *improvement* of the VIIB, which it resembles very closely, rather than as a totally new machine. It does not incorporate such needed innovations as a 5-to-1 intermittent movement coupled with a shutter giving 3 cutoffs per cycle or a curved anti-flutter gate, for example. But it *does* incorporate refinements of features which, though new to American projection practice, date back to the period 1925—1934.

Exclusive of the film-cooling features, we find in *old* Ernemann models such "modern" improvements as automatic mechanism lubrication, F:1.9 lenses, automatic emergency shutoff devices (which even controlled the port shutters); film tension pads adjustable while

the projector is running, and soundfilm reproducers attached as integral units of the picture mechanisms, *not* as separate unwieldy "heads" upon which silent-picture mechanisms are mounted, often crudely with the aid of shims.

Considering the deleterious effects of heat on film in the days of hot low-intensity arcs—which effects include film fires, naturally—it is understandable why German technologists recognized and attacked with considerable success the problem of keeping gate and film cool. German attention to this aspect of projection technology continued despite the total absence of drive-ins and despite the fact that comparatively few German theaters are large enough to warrant using high-intensity arc currents in excess of 75 amps.

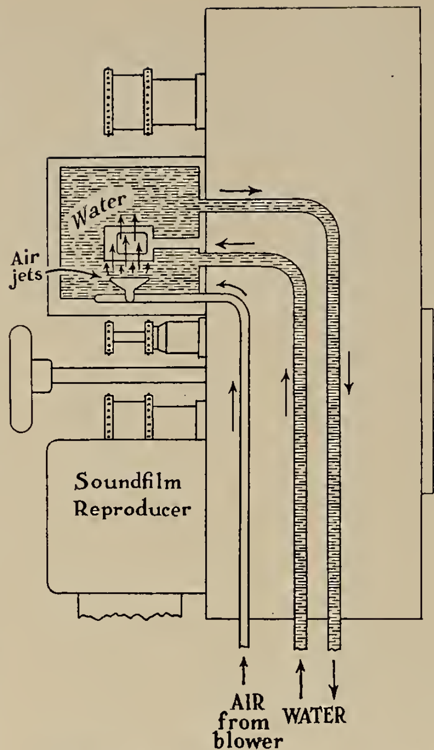
The Ernemann Cooling System

In the new Ernemann, the Model X, we find air-jets which direct controlled streams of cool air from a built-in blower at *both* sides of the film slightly below the picture aperture. The air then flows rapidly upward throughout the length of the gate, effectively blanketing the film and reducing its temperature. The air passes out at the top of the gate-enclosure.

This method of air-cooling succeeds in preventing irradiation effects such as buckling, embossing, and blistering of the darker, radiation-absorbing areas of the emulsion. The clear film-base remains relatively cold in every case with any projector, but heat conducted from the emulsion to the base may result in warped film.

It is interesting to compare the Ernemann air-cooling system with that of the Euro M2 projector. Although air is directed against the clear side of the film in the Euro by means of a tube, the emulsion side is forcibly ventilated by a rear cylindrical shutter having turbine-like vanes. The shutter enclosure provides for air intake at sides and bottom, and exhaust at the top. The Motiograph line of American projectors, beginning with the Model H, also uses a similar effective system of air cooling.

The cylindrical rear shutter of the



Diagrammatic representation of air- and water-cooling system of the Ernemann projector. The air exhaust-centrifuge for mechanical cooling is not shown.

Ernemann X also generates air currents, but these are directed into the middle section of the mechanism housing and drawn upward with considerable force by an exhaust centrifuge positioned at the top of the machine at the back side of the upper magazine. The mechanism itself therefore remains cold, regardless of the arc amperage used.

Water-Cooling also Used

In addition to air cooling, the Ernemann X (like the VIIB and the V) employs the most effective mode of water-cooling known. The entire gate casting is hollow, and cold tap water continuously conducted through it. The hottest arc produces no significant rise in the temperature of the metal parts of the gate. All water tubes, being integral components of the machine, are completely concealed inside the mechanism and base.

The water, after completing its circuit through the gate casting, passes out with its absorbed heat on its way to the drain. Only simple plumbing is involved, no more complex than that required for an ordinary wash basin. A cold film gate and track rails are absolutely necessary to minimize the fire hazard with nitrate film showings, to prevent film from warping and becoming brittle through gradual dehydration, and to make the projection room, if not exactly a sylvan bower, at least a comfortable place in which to work.

The Ernemann design refutes the oft-made assertion that conduction of heat from the film-track runners of the gate to the film is of trifling importance. It is recognition of the approximately equal importance of the two types of heating effect, irradiation **and** conduction, and ol relationship between the two.

Irradiation and Conduction

(1) Direct irradiation of the film by the arc-lamp beam, capable of causing embossing, permanent buckling, out-of-focus effects due to movements of the film photographs in the aperture during the flashing periods, and, in extreme cases, surface blistering in the darker portions of the emulsion.

Irradiation heating is combatted by air-cooling the film in the gate and, much less effectively, by the use of filter glasses, such as Jena BG-17 and special phosphosilicate glasses. Quartz plates are very expensive and not nearly so effective as heat filters.

(2) Conductive heating. That the conduction of heat from hot film runners, tension shoes, *etc.*, is a mighty important factor is proved by the fact that the temperature of the film winding up in the lower magazine is roughly directly proportional to the temperature of the heated metal parts through which the film must pass. Thus the film issuing from a projector just started up is cool or barely warm *even though irradiation is at normal level,* but gradually gets

(*Continued on page* 23)

PROJECTION CHART: How to Determine Correct Screen Size for Various Projectors.

Radiant Mfg. Corp., Chicago, Ill.

16 mm Sound and Silent	PROJECTOR TO SCREEN DISTANCE														
Lens Focal Length / Screen Size	8′	10′	12′	15′	20′	25′	30′	35′	40′	45′	50′	60′	75′	100′	125′	150′
1″	30″x40″	37″x50″	45″x60″	52″x70″	70″x94″	8′x10′	9′x12′	11′x14′	12′x16′	13′6″x18′	15′x20′					
1½″			30″x40″	37″x50″	45″x60″	63″x84″	70″x94″	7′x 9′	8′x10′	9′x12′	9′x12′	12′X16′	15′X20′			
2″				30″x40″	37″x50″	45″x60″	52″x70″	63″x84″	70″x94″	7′x 9′	8′x10′	9′x12′	11′x14′	15′x20′		
2½″					30″x40″	37″x50″	45″x60″	52″x70″	63″x84″	63″x84″	6′x 8′	7′x 9′	9′x12′	12′x16′	15′x20′	
3″						30″x40″	37″x50″	37″x50″	45″x60″	52″x70″	63″x84″	6′x 8′	8′x10′	12′x16′	12′x16′	15′x20′
3½″							30″x40″	37″x50″	37″x50″	45″x60″	52″x70″	63″x84″	6′x 8′	9′x12′	12′x16′	12′x16′
4″								30″x40″	37″x50″	37″x50″	45″x60″	52″x70″	63″x84″	8′x10′	9′x12′	12′x16′

Production-line assembly of RCA Theatre-TV projection units speeds equipment deliveries.

... first PICTURES ... then SOUND ... now "IMMEDIACY" to add PULLING POWER to your shows

JUST AS SOUND added tremendously to your box office, so theatre television offers you new box office "pulling power." For theatre-TV offers the patron a new concept of realism ... "immediacy" ... seeing events as they happen ... while they are fresh and newsworthy ... on a big theatre screen, in clear detail.

RCA is prepared to bring this new opportunity to the theatre owner. It has developed and designed a tested and reliable theatre-TV system. And it is now producing these equipments in quantity to provide for the needs of forward-looking theatre owners.

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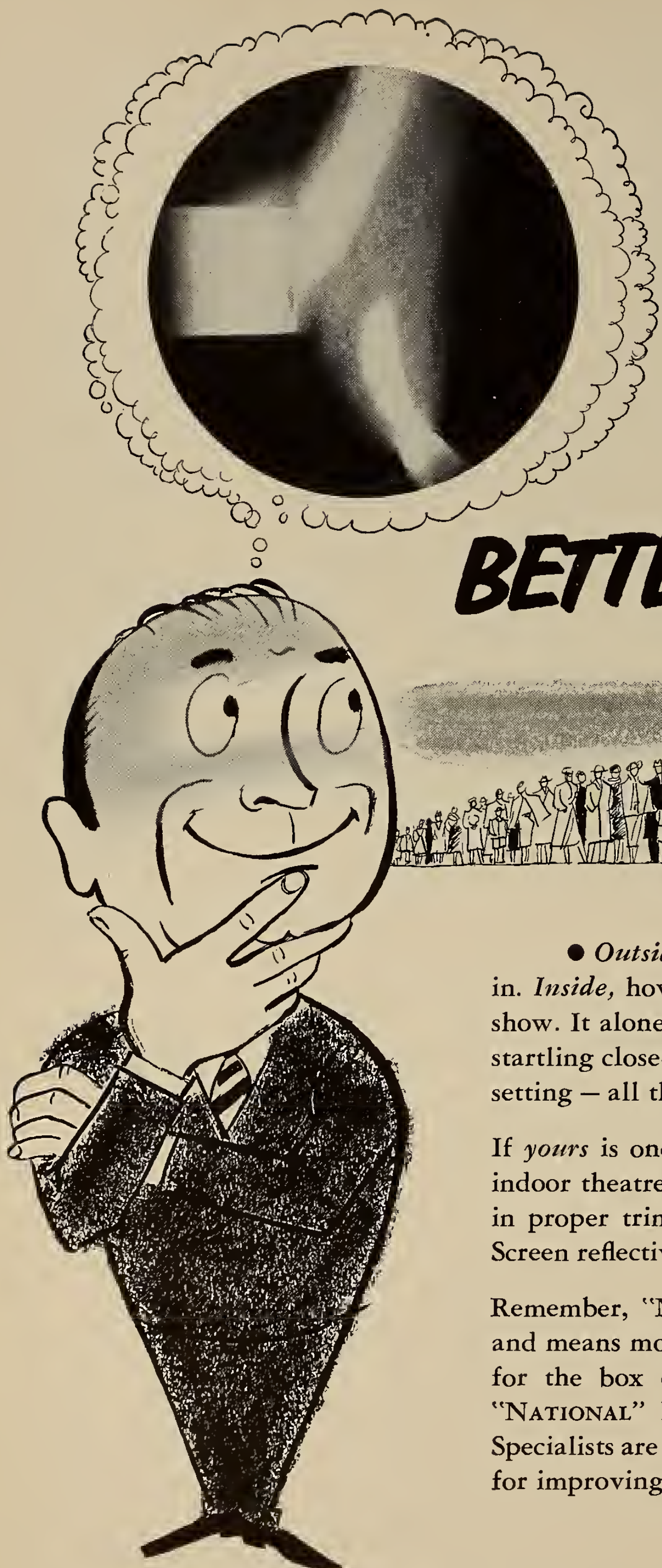


BRIGHT IDEA for BETTER BOX OFFICE!

Stereoscopic Motion Pictures

By J. A. NORLING
President, Loucks & Norling Studios, Inc., New York

Supplementing the article of the same title which appeared in IP for Aug., 1951 (p. 12) (and to be regarded as the second installment therof) is the appended extension of rmarks as they appeared in the Journal of the Photographic Society of America (Jan. 1952, p. 19). In the interest of greater clarity and balance, several paragraphs from the aforementioned IP article are repeated herein. Widely recognized as an authority on the stereo art, the author's stature is further enhanced by this presentation.

FROM time to time, the alternate projection of the members of a stereo pair has also been proposed. In this system, the right-eye image, for instance, is projected first, then the shutter interrupts the light beam while the film moves down to position the left-eye image. (Fig. 1). Thus there are periods of flicker that occur at different times for each eye.

If we break this sequence of events down, we find that the first light period has a value of 12.5% of the complete picture cycle. The flicker blade on the projector shutter (considering a two-bladed shutter) gives a dark period lasting 12.5%, to be followed by a light period of the same, then a long dark period consuming 62.5% for pull-down and eclipse to permit the other eye to see its image.

If standard sound-film speed of 24 frames a second is used, the resulting flicker is very annoying. Stepping up the projection to 48 frames a second increases flicker frequency twice, but it still is noticeable. There is a physiological effect that is likely to become disagreeably apparent — usually headache or nausea—after a few minutes of viewing pictures projected in this way. A complete period of darkness for one eye, while light reaches the other, will probably always result in visual fatigue, if not in nausea, no matter how high, within workable limits, the flicker frequency is brought.

Perception of Flicker

Flicker of low frequency calls for traction on the control muscles of the irises when bright light enters one or both eyes. The rapid occurence of the transmission of stimuli, first from one eye, then from the other, and the motor messages from the brain to the muscles, delivered in rapid sequence, probably accounts, in part, for the visual discomfort experienced by most people when viewing "eclipse" stereoscopic movies.

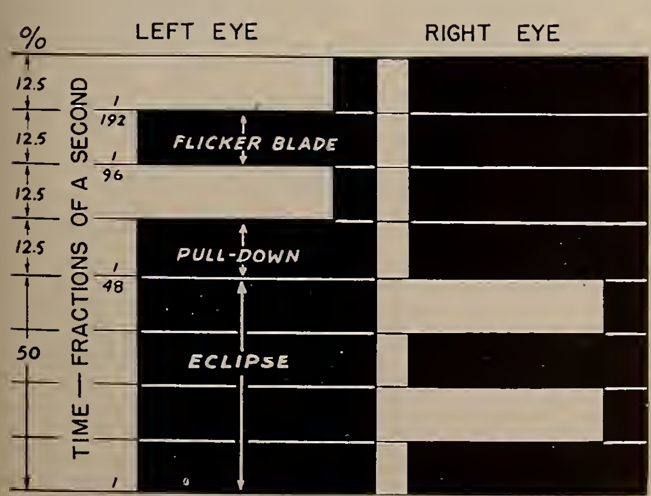
Perception of flicker depends upon the intensity of the interrupted light, as well as the flicker frequency. The more intense the light, the higher the frequency must go before flicker fusion is attained. Also, the larger the angular field over which flicker is distributed, the greater the consciousness of flicker. Hence, the dimmer the picture and the smaller it is, the lower becomes the flicker fusion frequency.

There are two ways to project and view eclipse sterograms. One is by using rotating or vibrating shutter devices held up in front of the eyes. These are synchronized electrically with the projector. The other method is to employ a rotating polarizer in front of the projector lens and polarizing spectacles for the viewer (Fig. 2). In one position the polarizer delivers light through the left spectacle filter; in the other through the right filter.

Eclipse Projection System

Alternate frame, or eclipse, projection should have at least twice the number of frames required for conventional films. That means doubling the length and providing for faster projection speed. If the alternate frames are photographed alternately, there is a very objectionable fringing in pictures of moving objects. This is a cause of eyestrain, especially in a picture when the action seen by one eye is in quite a different stage of progress than the action seen by the other. Difficulty in fusion invariably results.

This combination of disturbing effects caused by flickers out of phase between the eyes and by fusion trouble



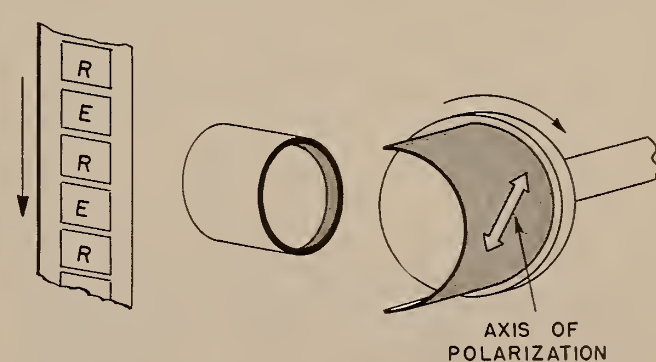


FIG. 1 (left): The light and the dark periods in "eclipse" stereoscopic projection.

FIG. 2 (above): Diagram of the "rotating polarizer" method of alternate-frame stereoscopic projection.

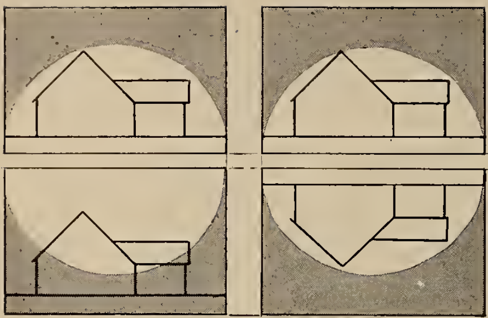


FIGURE 3

Illustrating the distribution of light over a pair of images. Left: As in an arrangement wherein both images have the same position. Right: As in an arrangement wherein one image is "flipped over" in relation to the other.

limits the appreciation of the eclipse method.

Complete visual comfort can be attained in stereo movies only if the two images are projected simultaneously, if they are rock-steady, if they are of equal brightness, if they are of equal contrast, if they are properly aligned vertically and horizontally, if far distant points are not separated too far in one image from that of the other, and if they are of exactly the same size.

Improved Single-Film Methods

Several inventions by the writer eliminate the drawback of the single-film dual-image arrangement, namely the unequal distribution of light. These methods employ novel optical systems which are accessory attachments to standard projector heads.

If one member of a stereogram has even a slightly different brightness, some eyestrain will result. If the difference is large, the resulting eyestrain will be great. This is because the action of the eyes' iris diaphragms is entirely automatic and not by voluntary control. If strong light falls on one eye, both pupils will contract and the eye seeing the darker image will have its pupil closed down more than it should be properly to see the image. In accommodation, too, both eyes act together and it is impossible for one independently to accommodate to a different extent from the other.

The improved single-film methods satisfy one of the basic requirements for good stereograms, easy to look at, in that both members of the pair are of the same brightness. Fig. 3 shows a pair of pictures having image attitudes in a conventional arrangement. It affords the best possible distribution of the light from the projector arc.

Area Light Distribution

The illuminating spot from the arc is considerably more intense in its center than in its outer regions. With images having the attitudes shown in the left-side diagram, more light falls at the top of one picture than at the top of the other, resulting in a different level of illumination in an area of one than in the corresponding area of the other. The arrangement shown on the right provides equal illumination in corresponding areas, because all portions of the light spot fall upon the same corresponding areas in each number. This meets the requirement that there be equal brightness for each image in order to attain complete visual comfort.

It may seem surprising that the intensity difference between center and edges of the light circle is significant. Actually, in practice, projection engineers are quite happy if there is only a 40% loss—60% as much light at the edges as in the center. In many theatre installations, the fall-off is as much as 50%.

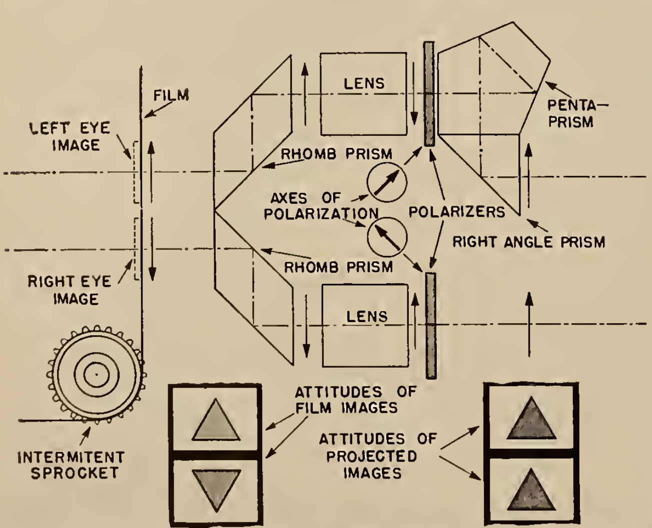
The projection end of this system, using standard projector heads, has two optical trains contacting prisms as well as lenses (Fig. 4). These components are arranged so that the light beam centers and exits normal to the prism surfaces and there is no displacement or distortion such as would take place with wedge prisms. Alignment of the images on the screen is effected by a micrometer control to shift the lenses.

In the lower optical train, transmitting the right eye image (the one having the conventional attitude), the image passes through in the conventional manner, reversing to "heads up" in the projection lens. In the upper optical train transmitting the left eye image (the one having the "flipped over" attitude) the image is brought to conventional attitude in a pentaprism and right-angle prism forward of the lens. The polarizers are placed in front of the lenses away from the intense heat.

Prints for this system of projection are not made directly from the original negatives. Duplicate negatives produced in an optical duplicating process are used instead (Fig 5).

Other Single-Film Methods

Another improved single-film method has the images turned on their sides (Fig. 6). This arrangement provides for the use of the full standard aperture in case the pair of images is to occupy only



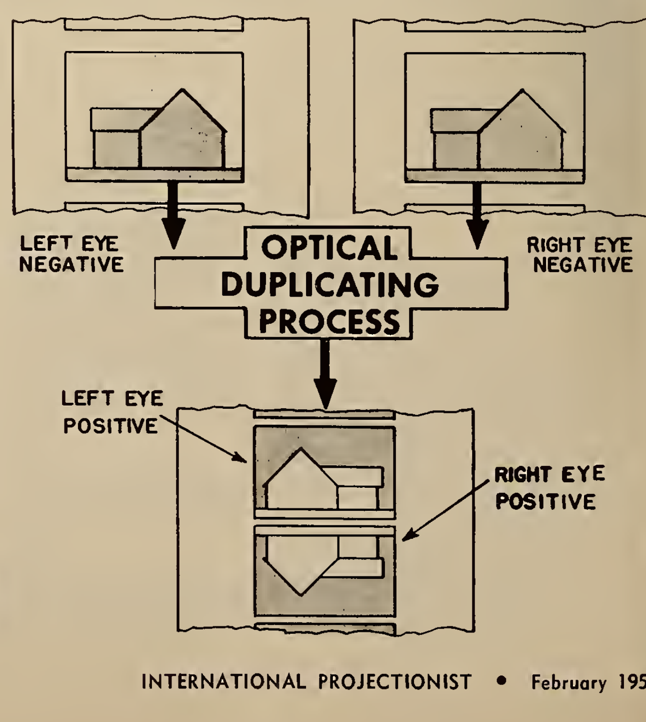


FIG. 4 (above): Diagram of an improved optical system for simultaneous projection of the two images comprising the stereoscopic pair.
FIG. 5 (right): Diagram of transfer of images from the two negative films for the single-film carrying the two disparate images.

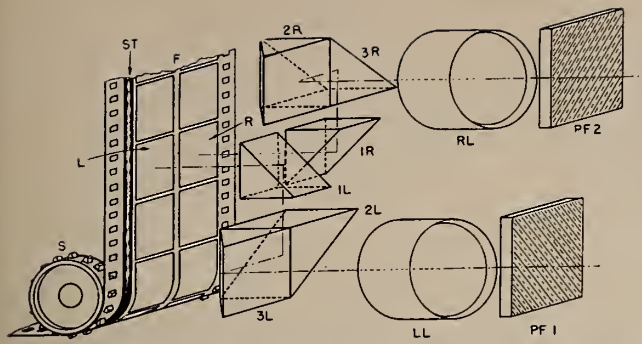


FIG. 6. Diagram of improved single-film method with the images turned on their sides.

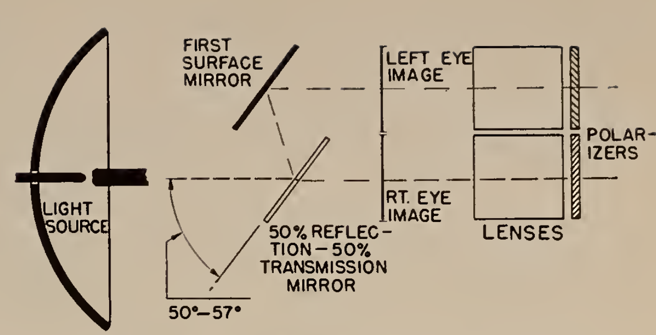


FIG. 7. Showing an arrangement that provides equal illumination for both images by using a partially transmitting mirror.

one standard frame. A series of prism elements between the film and the lens turns these images ,90°. The inverted image is "flipped over" in the penta-prism and right angle prism in front of the lens. Otherwise, the practical advantages of this variation are comparable to those of the method which is discussed in the preceding few paragraphs.

Another method, devised by the author, for attaining equal illumination for both members of the stereoscopic pair is shown in Fig. 7. Here, there are two mirrors arranged between the light source and the film. The lower mirror is a transmission-reflection type, with a reflective coating that will reflect half the light to the upper mirror, one-half the light passing through to one member of the pair. The upper mirror reflects one-half the original light beam to the other member. Again, two projection lenses are used, as in the other system with the polarizers in front of them.

In this system the images do *not* have to be inverted in relation to each other. since the illuminating circle falls upon the same corresponding area in each. The light-circle can be reduced in size to fit the area occupied by one frame, adding efficiency. Added efficiency also results from the reduction in the number of glass-to-air surfaces. Additionally, there is less possibility for dirt or "fogging" on the optical elements. In contradistinction to the other methods, which require no lamphouse changes, this method does require a few changes in the lamphouse to accommodate the two mirrors.

A dual-image, single film does not add significantly to print costs, to the costs of studio production, to shipping and handling costs between exchange and theatre, nor does it require dual projectors and added labor costs for projection. This single-projection method does not introduce the unwanted possibility of images out of synchronism with each other, a hazard that exists in dual projection. It assures precise registration, one image with the other. Alignment is no problem, since both images are framed together by the same frame-setting lever. There can be no jiggling or jittering between the images such as is present in any dual system, no matter how well made the projector mechanisms.

Other Stereoscopic Methods

The first stereoscopic motion picture was made by William Friese-Greene who patented his process in 1893. He used two negative films, one behind each lens. The positive images were projected side by side on a screen and viewed through a cumbersome stereoscope permitting each eye to see only the picture intended for it. The complexity of this system barred it from any commercial application.

The grid system has been frequently proposed and a large number of variations on the basic method have been suggested during the past 40 years (Fig. 8).

Basically, the grid system employs a screen containing a large number of vertically placed parallel opaque bars forming a grating having open or transparent spaces between them. This grid is placed some distance in front of the projection screen. the grating in the grid being designed so that the right eye sees only that portion of the screen on which the picture record for the right eye appears, the bars in the grating hiding the left-eye image from the right eye. It does the same thing for the other eye.

The chief problem in using the grid system is that the observer's viewing distance, angle of view, and of eye placement in relation to the grid are of a fixed interlocking relationship. Disturb one of the three and proper viewing fails. A slight shift to the right or left results in the breakdown of "correct individual seeing" for each eye, and a double image becomes apparent, or else a pseudoscopic effect results.

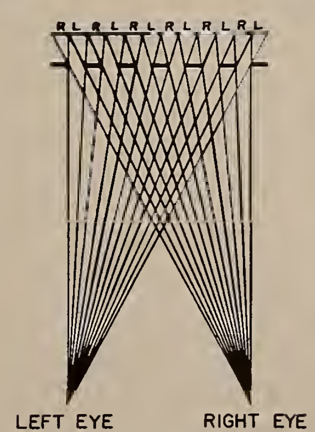


FIG. 8. Diagram of the fundamental "grid system" of stereoscopy.

Improvements have been made on the basic grid system, but serious shortcomings still remain as an intrinsic part thereof. This particularly applies to the loss of light. While a light loss is common to all stereo projection systems, it is particularly severe in this one, due to the fact that the opaque areas in the grating have to be (in most caess) about three times that of the open areas in order to keep the images from overlapping.

Another matter that must be given consideration is the appearance of the grating to the observer. The dark bars and light spaces should be small enough to be virtually invisible as a banded pattern. To make the grating lines invisible, the spacing of the elements should be no larger than about 1/3400 of the viewing distance.

We shall call the grating space G_s.

Then $$G_s = \frac{D_v}{3500} \text{ (or more)}$$

Where D_v is the viewing distance.

Thus, if $D_v = 60''$, $G_s = .0175''$, approx.

And if $D_v = 120''$, $G_s = .035''$, etc.

The distance, d_g, of any selected grating in front of the screen depends on the relationship of the distance D_v to d_g, or by the relationship of I to D_v.

With the usual grid system, the picture through the grating is viewed by converging the eyes at or near the grating. forming an angle. In order for the grating effectively to select the images properly for the eyes, the disparate members of the stereoscopic pair must be projected through the grating at the same angle.

[TO BE CONTINUED]

(See "Natural Vision" item on p. 22)

From the Production Front

Filming 'Quo Vadis' in Italy

A recounting of some of the technical problems that beset the camera crew in filming the biggest U. S. production ever made in a foreign country, as reported in *American Cinematographer* (Oct. and Nov. issues, 1951). A technological masterpiece.

By ROBERT L. SURTEES, A.S.C.

II.

BY THE end of the ensuing fourth day, we began to see the end of our troubles; by six p.m. we had 14 set-ups in the bag. From this time on, things went smoothly in the technical end, and we breathed easier.

Once the idea of this great picture began to impress itself in the minds of all taking part in its production, there seemed to be an almost super-human effort to assure its completion as well as to ease the way for those responsible for the important phases of its making. The religious aspect of the story did a great deal to engender this feeling.

Daily 'Takes' to London

Our daily takes were sent to the Technicolor Laboratory in London, where two prints of the results were made up. One print was sent to us in Rome, and the other to Hollywood. The lab results were wonderful, and the prompt service enabled us to pick up any retakes and added shots without undue delay.

The standard basis for exposure of Technicolor film, established by Technicolor's London Lab, is 750 foot-candles at a stop of T-1.2. The new low-level Technicolor film was not yet available to us, so we used the standard Technicolor film throughout. During the production shooting, we varied our exposure according to the screen effect desired. In order to gain depth of focus in several sequences we worked with light as high as 5,000 foot-candles. During the extreme light effect for the scene depicting the death of Nero, we worked at a light level of only 150 foot-candles.

Always keeping in mind the beauty of the costumes designed so magnificently by Herschel McCoy, I planned our camera set-ups with the idea of letting costume colors and the simplicity of Horning's sets carry the photography. Never was the lighting allowed to intrude.

Looking down on the big set of Emperor Nero's throne room for MGM's "Quo Vadis," filmed in Technicolor in Italy. Unusual overall lighting of the scene was achieved through use of huge diffusion silks and arc-light high above the set.

Warm, Rich Light Level

Because I felt that the entire film should be on the warm, rich side, all backlights were filtered slightly amber. This idea was carried throughout the picture, but at no time did the lighting on the colorful costumes and sets fall below the color temperature level required to render faithful reproduction on the screen. This is not to say that we "flat-lighted" everything. Perfect color rendition can be secured even in extreme effect shots if light units are used on principal set objects such as draperies, *etc.*—and providing light is kept from splashing over on other parts of the set.

350 Foot-Candles Level

In the set of Nero's Throne Room, we strived to get an almost shadowless effect. This entailed hanging 50-foot square silks on one side of the set, from behind which we projected light from arcs. This gave us a soft illumination of 550 foot candles over the entire set. The result was an almost third-dimensional effect on costumes, players, and other objects within the scene.

As the picture progressed, the style of lighting was changed to meet the changing pace or mood of the picture. In filming all the interiors during the burning of Rome sequence, an effort was made to keep all highlights and "kickers" on the copper-toned side.

Photographic Climax Achieved

For the sequence after the fire, sets were lighted entirely from the floor in order to achieve the dull, foreboding effect called for in the script. Then, as the time of Nero's death approaches, we began to start the real effect lighting. This was done in a progressive manner, becoming more and more effective until, during the Nero death scene, we actually achieved a photographic climax, too.

Generally speaking, the lighting of "Quo Vadis" was kept very simple. We tried to maintain a classic style, for any other type lighting on the settings of Roman villas, baths, *etc.*, with their many columns and straight-line architecture, would have been in bad taste. Always, we strived to keep the camera and the lighting from "running away" with or stealing the scene.

William Skall, A.S.C., photographed, and Tony Mann directed the night scenes of the burning of Rome. For 24 nights they worked in the burning streets, among the thousand of screaming extras. It was a difficult assignment, and ex-

(*Continued on page* 29)

Heat-Transmitting Mirror

Radiant energy incident upon a glass plate can be divided into *transmitted* and *reflected* bands by the interference effect in thin films of dielectrics deposited on the glass. The mirror described here* reflects more than 95% of incident visible light and transmits a large part of the energy beyond 7000 A. Such mirrors have been produced; typical transmission characteristics are shown. Several arrangements for use of such a mirror with a carbon arc are also shown. See elsewhere herein pertinent relative statements.

By G. L. DIMMICK and M. E. WIDDOP

THE problem of producing "cold light" has occupied the attention of scientists and engineers for many years. A number of methods have been successfully employed for reducing the relative amount of radiant energy which lies outside the visible spectrum. One approach to the problem is to employ a light source which radiates a large portion of its energy in the visible spectrum.

The fluorescent lamp and the mercury-vapor lamp are examples of this type of source. Unfortunately, the unit brightness of the fluorescent lamp is too low to have much application in optical systems of the projection type. Fluorescent lamps are, however, used extensively for general lighting where the area of the source can be relatively large.

Spectral Deficiencies

High-pressure mercury-vapor lamps are capable of producing large values of brightness, but they are deficient in red energy, and a large part of their radiation is concentrated in a number of discrete lines. The addition of cadmium vapor into a mercury-vapor lamp greatly improves the distribution of energy in the visible spectrum and makes this type of lamp a potential competitor to the carbon-arc and the incandescent lamp for application in projection-type optical systems.

Other Avenues of Approach

Another approach to the problem is to employ a carbon-arc or incandescent light source and to remove as much of the infrared energy as possible with the aid of absorption filters or with heat-reflecting mirrors.

Absorption filters may be made of special heat-absorbing glass or they may be cells covered on both sides with ordinary glass and having a liquid, such as water, flowing continuously through them. The heat-absorbing glass filters usually require a current of air to flow past the two surfaces to carry away the heat.

A well-known type of heat-reflecting mirror is produced by evaporating a thin film of gold onto one surface of a plate of glass. The thickness of the gold may be such that its transmission is maximum for green light and its reflectivity is high in the infrared region of the spectrum. Heat-reflecting mirrors of this type have a very limited application because the transmitted light is peaked in the green and the transmitting efficiency is low even at its peak.

Interference in Thin Films

Still another approach to the problem is to use the principle of interference in thin films to build up the reflectivity for light within the visible spectrum and to permit the infrared energy to be transmitted. It is toward this solution to the problem that this article directed.

The use of multiple films for the production of dichroic mirrors has been covered in the literature. It is sufficient to say that efficient dichroic mirrors may be made by evaporating on glass alternate layers of two transparent dielectric materials, one of which has a relatively high index of refraction while the other has a lower index of refraction. The thickness of each layer is usually made to be one-quarter (¼) wavelength for light of the color which is to be reflected.

It is possible to make dichroic mirrors which reflect as much as 95% of the light of one color and transmit 90% or more of the light of another color. A typical curve for a dichroic reflector is shown in Fig. 1. The peak reflection occurs at about 450 mμ while the peak transmission occurs at about 650 mμ.

Dichroic Reflector Advantages

One of the important characteristics of a dichroic reflector is that the absorption of visible and infrared radiation can be made negligibly small. This means that radiation which is not reflected from the multilayer film is freely transmitted through this film. It was this property which gave the authors the idea for a heat-transmitting mirror which would reflect efficiently only in the visible portion of the spectrum.

The idea was to deposit several sets of multilayer dichroic films on the surface of a plate of glass. Each set would be so controlled as to cause its peak reflection to occur at a different wavelength. The peaks would be equally spaced through the visible spectrum so that all portions of this spectrum would be reflected efficiently. Light which did not reflect from the outermost dichroic film would pass through this film to one of the inner films, where it would be reflected and would then pass back through the outer films to the surface.

The first test of the idea was made several years ago by RCA. Two sets of dichroic films were deposited in succession on the surface of a plate of glass. The thickness of the layers of one set was so controlled as to make the peak in reflectivity occur at 490 mμ. The other set of layers was made to have its peak reflectivity at 650 mμ. The transmission curve of the completed mirror is shown in Fig. 2.

Steady Advances Registered

As expected, a curve with a double hump was produced by the aforementioned procedure and the efficiency of the reflector was greatly improved. The results of the first tests were so encouraging as to warrant a systematic study of the different parameters upon which the overall effectiveness of heat-trans-

* J. Soc. Mot. Pict. & Tv Engineering for Jan., 1952.

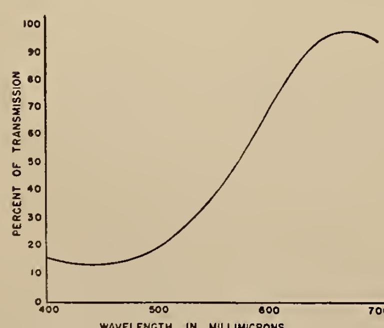


FIG. 1. Transmission curve of a typical dichroic.

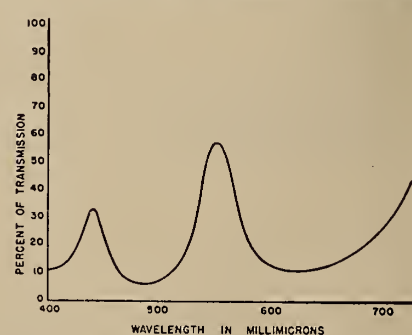


FIG. 2. Transmission curve of dichroic consisting of two sets of layers.

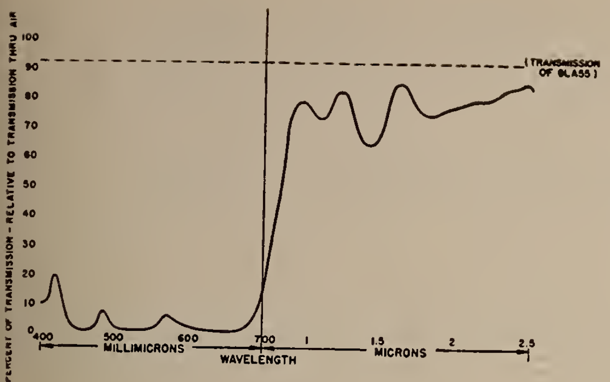


FIGURE 3

Transmission characteristics of a heat-transmitting mirror.

mitting mirror is based. Development work on this project continued intermittently for several years. The improvements which were made resulted in mirrors having a degree of reflectivity which is greater than that of a back-silvered glass mirror.

The curve in Fig. 3 shows the transmission of one of the improved designs as a function of wavelength. It will be observed that the average transmission from 400 to 700 mμ is less than 10%. Since there is no appreciable absorption, this means that the average reflectivity over the visible spectrum is more than 90%. Beyond 700 mμ, the transmission rises rapidly. The average transmission between 700 mμ and 2.5 μ is about 80%.

Transmission Characteristics

Since most of the energy from a high-intensity carbon arc is below 2.5 μ, the transmission characteristics of the heat-transmitting mirror beyond that wavelength are not shown in Fig. 3. However, the transmission has been measured out to 8 μ, and shows a sharp drop just beyond 2.5 μ. The average transmission between 2.75 and 4.25 μ is about 50%. Beyond 4.25 there is another sharp drop and the transmission from 5.25 to 8 μ is about 1%.

The first drop in transmission is characteristic of absorption due to water vapor, and the second is characteristic of absorption of glass. It is unlikely that there is appreciable reflection by interference at this part of the spectrum, since the deposited films are thin in comparison to the wavelength.

Liquid-Cell Application

The effectiveness of the heat-transmitting mirror was determined by measurements made with the arrangement shown in Fig. 4. A beam of radiant energy from a high-intensity arc lamp, *A*, was directed toward the heat-transmitting mirror, *B*, placed at an angle of 45° with the axis of the beam. A portion of the energy passed through the mirror and was absorbed by a black solution in the liquid cell *C*. The remainder of the energy was reflected from the mirror, *B*, and was absorbed by a black solution in liquid cell, *D*.

The liquid-cells were identical in size and each contained the same amount of a mixture of water and India ink. An accurate thermometer was placed in each cell and the liquid was allowed to come to room temperature before turning the arclamp on. The arclamp was started and allowed to stabilize, after which the shutter was opened.

The liquid in both cells was stirred constantly and temperature readings were taken once each minute for ten minutes. The temperature readings from both cells were plotted against time, and a smooth curve was drawn through the points. Straight lines were drawn tangent to each of these curves at the starting point, where the liquid was at room temperature.

The slope of each of the straight lines is proportional to the rate of absorption of energy. The ratio of the two slopes is,

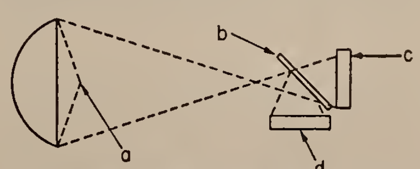


FIG. 4. Setup used for measuring heat transmission and reflection of mirror.

therefore, a measure of the ratio of the total energy reflected from the mirror to the total energy transmitted through the mirror. In the case of the high-intensity arc the aforementioned measurement revealed that 46% of the total energy was transmitted, while 54% was reflected. Another measurement made with a 750-watt incandescent lamp as a source revealed that 75% of the total energy was transmitted, while 25% was reflected. These measurements were made with the mirror at 45° for convenience.

A test was made to determine the change in transmitted energy when the position of the mirror was shifted from 45° to normal-to-the-beam. There was no significant change.

Distribution of Energy

The energy reflected from the mirror may be divided into two parts. The first part is due to the useful visible light between the limits of 400 and 700 mμ. The second part is the unwanted infrared energy which the mirror fails to transmit.

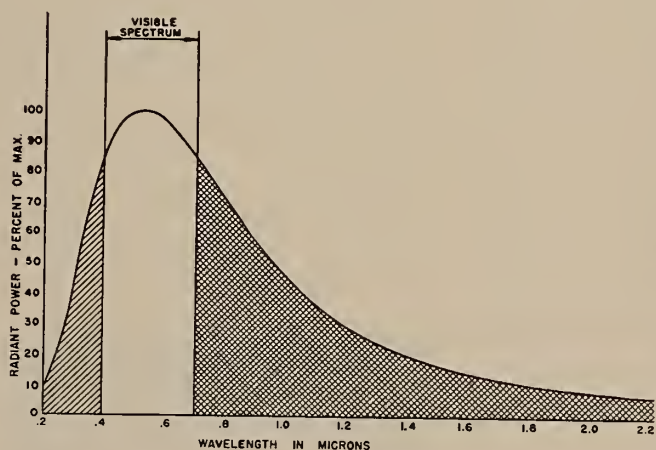


FIGURE 5

Radiant power vs. wavelength for black-body operating at 5500 K.

The first value can be obtained from a curve of radiant power versus wavelength for the light source operating at a temperature of 5500 K. This is the approximate color temperature of a high-intensity carbon arc of the type used for motion picture projection.

By measuring the area under the whole curve in Fig. 5 and comparing this with the area under the visible portion only, it is found that about 35% of the total energy from a high-intensity arc is radiated within the *visible* spectrum.

Using this value, together with the previously obtained values of total reflected and transmitted energy, we can easily determine the overall performance of the heat-transmitting mirror. This is shown by means of a chart (Fig. 6). From this it may be seen that the mirror

(*Continued on page* 27)

Illumined Screen Surround? No; Rounded Masking Corners? Yes

By ROBERT A. MITCHELL

Regrettably, an excerpt from a letter by Mr. Mitchell, intended solely for a reference data file, was inadvertently put in type and published under the heading "To Mask — or Unmask" on page 16 of the last issue of IP (January). Because this relatively informal presentation did not adequately express his views, Mr. Mitchell asked that the appended over-all summary be published forthwith.

IN THE January issue of IP there appeared a portion of a private communication of mine regarding maskless screens, together with a commentary thereon by Messrs. Schlanger and Hoffberg, originators of the "winged" type of surround illuminated by the projected picture, itself. Much as I respect the opinions of these industrious gentlemen—rest assured that I wish them every success with their setup—I must, in the interests of the dramatic and pictorial quality of the theater motion picture, take issue with them.

First, the number of Schlanger screens now in use is much too small to permit anyone to rate this screen on the basis of chance patron remarks and lobby questioning. In short, the Schlanger screen is too unimportant, as yet, because most persons in the group which is responsible for the main volume of box-office dollars have never seen a show projected on the Schlanger surrounded screen. When 100 "average" theaters—not "class" houses alone—have thus been fitted, we will be willing to listen to those who have a commercial interest in the Schlanger screen.

Maskless Screen Acceptance Scouted

Undoubtedly, my rather abbreviated and seemingly arbitrary statement that "such surrounds are preferred by a *minority* of moviegoers," puzzled Schlanger. Unfortunately, I did not know that I was writing for publication. What I meant was this: I am positively convinced that the movie public, by and large, is interested only in the picture on the screen, the excellence of its story, direction, acting, photography, sound, *etc.*, and the professional smoothness of its projection.

This conviction stems from unfortunate experiences with color and lighting effects on side drapes, *etc*,—effects which went over big with sophisticated audiences but which fell flat on their face in the "average" neighborhood-type theater. As a projectionist I am very much the slave of the preferences of audiences, just as the exhibitor (and I have had working experience in *that* field, too) will book nothing but grade B westerns if that is the type of picture his patrons want—even though he, himself, cannot bear to sit through even one of them.

As a result of my experiences, and by trial and error (my mistakes have been many) I have learned that the average audience absolutely refuses to tolerate distractions, no matter how visually pleasing they may be from a purely esthetic viewpoint. I have devoted years of thought to the matter of screen masking to find the system which minimizes extraneous effects as much as possible. One of these enemies of satisfactory projection is the square-cornered black masking setup.

Favors Rounded Screen Corners

I subscribe wholeheartedly to the Schlanger statement that "black masking" draws such comments as "morbid—boxed-in—looks like a picture on a wall," providing that the standard type of masking used in the majority of our theaters is meant. By experimentation I have found that *rounded* corners solve the problem satisfactorily. Black masking having rounded screen corners exerts definite effects on the patron, such as:

No "picture-frame" effect by means of the elimination of masking and the absence of the conventional proscenium opening is shown here, one of the early contributions of Ben Schlanger, the modern-minded architect. Convergence of the forward side walls, only a little wider than the screen itself, positions the screen image in a "natural" field of self-created light.

1. No distracting sharp corners.
2. Nothing before the patron's eyes except the picture alone; and it is the *picture* he pays to see.
3. Tendency to focus attention at center of screen, where significant action takes place in most scenes, as planned by the cameraman.
4. The cameraman's work gets a more advantageous display.
5. Because of the absence of all points and sources of distraction of a visual nature, the boundaries of the picture seem to "melt" to give a picture area of indeterminate shape and size; that is, the patron becomes more quickly absorbed into the drama of the film and loses consciousness of surroundings and picture edges, even though the edges are sharp.
6. Decrease of the inherent "flatness" of the 2-dimensional picture. By this I mean that while no stereoscopic effects are produced, the patron "forgets" that the picture is flat.
7. Retention of standard motion-picture format undistorted by the simultaneous-contrast effects induced by all types of illuminated screen surrounds.
8. The appearance of increased picture brightness and uniformity of illumination.

There is nothing new about the round-cornered screen, of course. In fact, it's as old as the movies. But I see it as a good thing, have made and am making efforts to revive it in the best interests of theater motion pictures. I am sure that the Schlanger people would not have enjoyed the *hundreds* of favorable comments I have received whenever I have changed square-cornered screens to round-cornered ones. More emphatically, let me add that, whenever I would reverse the process to see what the reaction would be, patrons would *without exception* request restoration of the round corners.

I discussed this subject in IP.* The

* "Psychological Elements in Projection"; IP for May, 1949, p. 14.

screens I advocate were illustrated therein and directions given for the preparation of the masking. *Any* projectionist can prepare this screen, since I have nothing to sell except an idea. I have no financial interest in any screen, equipment, or motion-picture process, hold no "rights" or patents, and receive no royalties. My position is that of the average projectionist who takes a keen interest in the welfare of the movies because the movies mean a livelihood.

In case my ideas sound extravagant, I refer interested parties to an unsolicited "Letter to the Editor" on page 22 for August, 1949, of IP in which occurs the statement:

"We are using rounded screen corners now and we can say that they encompass every advantage claimed for them by Mr. Mitchell."

Added Emotional Values?

Regarding the Schlanger-Hoffberg quote: "The maskless screen is described as 'cheerful — natural — scenic — better color.'" A whole chain of arguments could be started over these descriptives. Certainly, the imposition of emotional values on motion pictures by screen manufacturers might lead producers to think that their product is being tampered with, especially in those cases where the production of those values was a coldly automatic process, entirely beyond the control of the projectionist or other person who understands the "feel" of a picture. We do not want a "cheerful" screen when scenes of shipwreck, disaster, or battle are being projected.

The adjective "natural" is a little hard to swallow. Extraneous surround light was not present in the original scene, so why should it be called natural? "Scenic?" Perhaps. But phantasmagoria seems out of place during a tense emotional scene. "Better Color?" Well, let's analyze that one.

Effect on Color Films

I have written a number of articles on color motion pictures and have mentioned Technicolor and Dr. Kalmus, General Director, quite frequently. This a liberty on my part, of course, because I am not authorized to speak for Technicolor: I have no connections whatever with Technicolor or any other processer of natural-color films. In view of the existence of two distinct phenomena—the reflection of light from the Schlanger surround "wings" and the induction of simultaneous contrast in the psycho-visual centers of the viewer, I state without qualification that Technicolor, Ansco-color, Ektachrome, Trucolor, Cinecolor, *etc.*, undergo no improvement whatever when projected on the Schlanger setup.

Reflection may either intensify or weaken colors on the screen, depending on the distribution of colored areas in the picture. Simultaneous contrast may cause either the colors on the surround or the colors at the very edges of the picture to tend toward their complementaries, weakening the colors or producing spurious colors in areas of low saturation.

The Requisite for Color

I also take issue (in unsolicited behalf of Technicolor) with Schlanger's assertion that the "color boys" have never bothered to give projection conditions a passing thought. Apparently Technicolor's printed instructions to projectionists and exhibitors, given wide circulation a few years ago, have never come into the hands of Schlanger. The production people, including the cameramen and the "black-and-white boys," take projection conditions most seriously, even though they have not conspicuously interfered with the projectionists department. I reside in a community visited frequently by top-notch producers and cameramen, with many of whom I have discussed a wide range of motion picture topics, and therefore feel quite secure in making certain estimates of the worth to the industry of quite a number of things.

It is gratifying to know that Schlanger has conducted tests anent the reflections to the screen surface of light picked up and reflected back by the surrounds. Unfortunately, he produced no figures to support their claims—figures of interest to all projectionists.

"Wing" Material's Composition

My own tests to which I referred include both matte and specular materials, as well as flat and fluted construction of the surround wings. In fact, I could use many types of materials which Schlanger cannot use because of their commercial impracticability. Why did it require years for Schlanger to find the proper commercial materials? Semi-specular resin coatings of a wide variety of physical and chemical properties have been available for many years.

The writer's opinion is that Schlanger's wings are not as specular as they ought to be for the best results with the type of effect his screen surround is designed for. To contradict him flatly, unless his wings are highly polished mirrors (which they are not) a really appreciable amount of back reflection to the screen must occur—perhaps 8% over the brightness of a uniformly illuminated screen at the sides, and about 3 or 4% at the center. I challenge Schlanger and Hoffberg to go on record by publicly refuting the general validity of these figures with their own setup.

I commend to exhibitors a trial of the Schlanger maskless screen, so-called; I say "so-called" because the screen is really masked, but with fluctuating illumination instead of with a total absence of extraneous light. For many city houses this novel screen may prove just the thing to keep the clientele happy for a time. I do not recommend any type of illuminated surround for small-town and neighborhood houses except possibly for the showing of short-subjects only. I base this recommendation upon my own experience of public preferences, fully realizing that many different classes of persons like the movies.

Psychological Factors Involved

There is a psychological factor involved in all attempts at illuminated screen surrounds. The continuance of these atempts, despite their lack of acceptance in the average location, despite their unavoidable extension of 48-cycle flicker to the highly sensitive peripheral region of the eye, as in the Schlanger setup, and despite the conspicuous appearance of flatness they impart to the projected picture, leads me to believe that these are subconscious attempts to enlarge the picture, or viewing, area.

We want larger pictures, and the illuminated surround is merely the concrete manifestation of a desire which our 35-mm film, long-focus lenses, and inadequate arc-lamps—not to speak of peripheral flicker—do not allow being fulfilled at the present time.

'IN THE SPOTLIGHT'

The "In the Spotlight" department is necessarily omitted from this issue of IP due to the illness of its editor, Harry Sherman. Now recuperating, Mr. Sherman, it is hoped, will be able to resume his departmental chores in time for the next (March) issue.

IP Question & Answers

From time to time IP receives queries relative to various phases of the projection process, visual and sound, which the correspondents request be answered in a forthcoming issue or on a *sub rosa* basis by direct mail.

IP holds that for the greater good of its subscribers such questions—stemming as they do from practical experience in daily operation—should receive the widest possible circulation. To this end, therefore, IP proposes to inaugurate a Question & Answer Department as a regular monthly feature, in which will be answered any and all questions on any phase of visual and sound reproduction. Anonymity will be preserved, with not even initials of the correspondent being used.

The value of this department is dependent wholly upon the degree of response from the field. So—the rest is up to you. You ask—we'll answer.

Genarco's New, Long-Burning H-I Carbon Disc Arclamp

OPERATION for several hours without interruption of the arc, and a very great brightness of 1800 candles per sq. mm. are two outstanding features of a new high-intensity carbon arclamp which has been developed by Genarco, Inc., of Long Island City, N. Y.

The arc is struck between an 11-mm positive carbon and a graphite disc which is 8 inches in diameter, as shown in Fig. 1. The current is 200 amperes. The lengths of positive carbons are supplied by a magazine which automatically joins the carbons so that there is no interruption of the arc.

Operating Principle of Disc

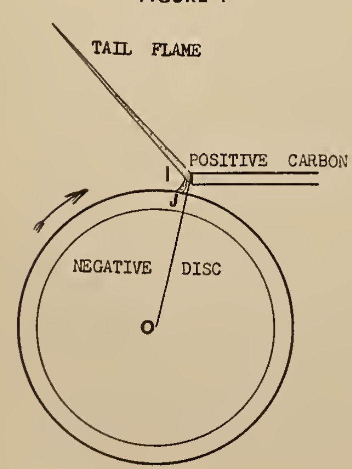
The negative disc rotates very slowly around its center, thus consumption is very slow. The initial 8-inch diameter of the disc is reduced to 5 inches after 20 hours of operation. The disc is 6 mm thick. The positive carbon is held by water-cooled jaws which also feed the current to the carbon. The current is fed to the center of the negative disc. As the disc wears down (and its diameter decreases) the center of the disc moves slightly toward the arc in order to maintain the same gap between the disc and the positive carbon.

Precise Arc Gap Maintained

One motor drives the feed mechanism of the positive carbon, rotating the carbon and feeding it into the jaws. The same motor also drives the magazine which feeds the carbons and joins them together. Another motor rotates the disc at the proper speed in order to maintain the arcing point on the disc at the point *I* (Fig. 1) on the line which joins the center of the positive carbon to the center of the disc. The same motor lifts the center of the disc in order to maintain a constant arc gap (distance *I—J* in Fig. 1).

The rate of feed of the positive carbons and the rate of rotation of the negative disc are automatically adjusted by

FIGURE 1



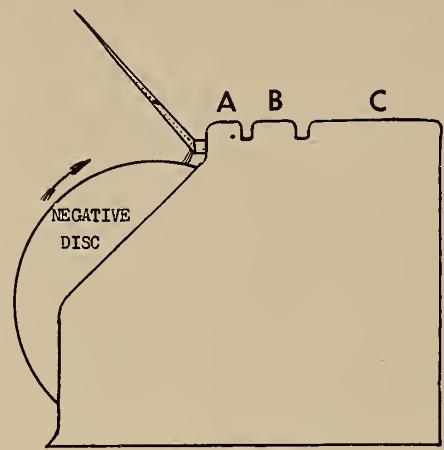


FIGURE 2

the location of two electric probes in the flame of the arc. The protrusion of the positive carbon out of the positive jaws is maintained with a precision of 0.025 inch.

The brightness of the positive crater measured in the axis of the positive carbon has been found to be 1800 ft.-candles per sq. mm. The arc is operated at 200 amperes at 80 volts.

This new burner (designated by the manufacturer as Model P. 1 and shown in Fig. 2) was developed primarily for military applications, but it is already apparent that it will be used where very bright and very small sources of light are necessary, such as powerful spotlights, color theater Tv, lighting for high-speed cameras, etc. Further details of the arc are available from Genarco at 36-56 Thirty-Fourth St., Long Island City, 6, New York.

Conservation—Plus!

Every theater in the U. S. and all IA projectionist Locals have received copies of the following conservation bulletin issued by the NPA motion picture section, Nat Golden, director.

Film supply is TIGHT—so tight that every effort must be made to conserve supplies.

REDUCE NEEDS FOR REPLACEMENT FOOTAGE BY AVOIDING DAMAGE IN THE PROJECTION ROOM

A recent investigation shows that most of the damage to prints is caused by:

IMPROPER THREADING AND OPERATION OF PROJECTORS

Much film damage has been traced to film improperly placed on sprocket teeth . . . improperly adjusted and aligned idle rollers . . . excessive gate tension . . . badly aligned guides . . . jammed magazine fire trap rollers . . . excessive tension in feed and takeup magazines . . . projector loops too small or too large . . . excessive emulsion deposits on gate shoes and guides and oil deposits on film.

IMPROPER REWINDING OF FILM

Half of all film damage is caused by improper rewinding. Faulty rewinding usually results in total loss of the print by destroying edge areas that cannot be repaired. Avoid film waste by making sure that you—

REWIND EVENLY AND SMOOTHLY
ALIGN REWIND HEADS PROPERLY
DO NOT "CINCH" FILM TIGHT

BLISTERING

Severe blistering of film is much too frequent, particularly in Drive-In Theaters and other places using projector light sources of very high amperage. Building up excessive light has resulted in the destructive blistering of emulsion on safety film prints and the total destruction of nitrate film prints.

Avoid film blistering by—

Making a careful check to find the danger point in the concentration of your light source.

Constantly checking all film and gate cooling devices to make sure they are operating properly.

Not changing the assembled arrangement of crater, condensers and reflectors unless you are sure that you know what you are doing.

BAD SPLICING AND SPLICING EQUIPMENT ADJUSTMENT

Run-offs, breaks, and other difficulties that ruin picture quality and shorten the life of prints inevitably result from poor splicing methods and improperly adjusted splicing equipment.

Remember when you are splicing to—

Use the proper kind of fresh cement.

Scrape the film properly.

Have your splicing equipment adjusted perfectly.

Allow enough hold-down time for the cement to set.

Movies Aid Canadian Cancer Drive

The Canadian motion picture industry has made itself a valued ally in the crusade to control cancer, according to the Canadian Cancer Society. The industry in Canada has made it possible for the Society to report directly to the theater-going public the significant developments in the cancer program each year.

Prints of a color film were sent to film exchanges throughout Canada. It is conservatively estimated that at least two million people have seen it. Its success has assistance of the motion picture industry, been made possible by the cooperation and particularly Canadian theaters

Cooling Means: A European Viewpoint

Stemming from the publication in IP for Nov., 1951 (p. 5) of "The Trail of the Elusive Screen Lumen," by Charles Hahn, is the appended discussion of the type and arrangement of glass filter strips in order to decrease the heat on the film.

By PAUL SCHANZ
Zurich, Switzerland

IT WOULD seem that most of your American equipment manufacturers are a bit one-sided on the subject of cooling methods for cinema projectors. Having at last recognized the importance of the heat problem, they do not seem to know what to do about it.

To be specific: Dr. Kolb of the Eastman firm, Mr. Davee of Century Projector, and Mr. Hahn of McAuley (Peerless arclamps), disagree among themselves as to the most effective means for maintaining both the film and the projector mechanism at reasonably low temperatures for the avoidance of damage. Dr. Kolb advocates air-cooling of the film, Mr. Davee water-cooling of the film "gate," and Mr. Hahn the use of heat-absorbing filters between the lamp and the mechanism.

It seems to me odd that each of these technologists deprecates the particular methods advocated by his colleagues without pausing to reflect upon the other fellow's viewpoint.

The Case for Heat Filters

Heat filters may be good if thye are kept clean, but I am unable to understand why costly quartz plates or easily damaged interference coatings are regarded as necessary by so many American projection men. Very good optical glass filters are probably available in the U. S. A. as elsewhere (correct me please if I am wrong). Jena heat-absorbing filters had been developed to supreme perfection before the end of the war. Projectionists wishing to use heat filters could choose from several types; but to my knowledge no one entertains the false notion that *all* the radiant heat is done away with when all intra-red is absorbed by a filter. Visible light accounts for a large portion of the heat evidencing itself at the picture window and film runners.

One Filter of Proper Thickness

I should like to be informed as to the basis of Mr. Hahn's frequently repeated statement that studio background projection and theater projection problems are totally different and unrelated. Mr. Hahn's figures for light-loss occasioned by heat filters are no less mystifying.

Because good Jena heat-absorbing filters are listed as transmitting 98% of visible light, it is obvious that the loss of light is essentially a loss due to reflection from surfaces, and not a loss caused by absorption. Why did Mr. Hahn not recommend that only *one* filter glass of the proper thickness be used, instead of a holder which permits the insertion of as many as 6 filters? Mr. Hohn must surely be aware of the fact that the spectral absorption characteristics of several thin filter glasses placed together is exactly the same as that of a single correspondingly thick glass having only 2 surfaces to waste light by reflections. This behaviour of filters is an established law of physics and is not subject to personal opinion.

A Jena filter glass suitable for the reduction of heat in the cinema projector transmits 98% of the visible light and reflects about 5 or 6%, resulting in a total loss of only about 7%. Like Mr. Hahn, I cannot comprehend the reason for an absorption so high as 20% of the light; but also I cannot understand his statement that as much as 14% of the light may be lost when filters are used. Are such great light losses tolerated in American projection practice?

It is possible that a misunderstanding of some kind has arisen, unless Mr. Hahn refers to reflective-coated glasses which, as pointed out by himself. are impractical in use because of the deterioration of the coatings.

High-Velocity Air Stream

High-velocity air stream apparatus costs very little whether incorporated in the projector or added to a non-cooled mechanism of the standard American type. Projectionists who have used this effective method with powerful Beck arcs (high-intensity) laugh at persons who think that expensive compression pumps, cooling units, or complicated pipe-work is involved; such thinking is beyond their understanding.

It is possible that the joke is on your projector manufacturers? How come that you Americans feel that you must practically *blast* the film with air under terrific pressure? It is wholly and completely unnecessary, as several of the European projectors make known.

Over-all Effect Very Good

While cooling by air and water flow do not directly reduce irradiation effects. such methods definitely cool the film by conducting heat away from the edges, which otherwise would get very hot. The powerful arc rays then have difficulty warping and otherwise inflicting damage on the film—a matter of thermal conduction. In addition, the air-flow cools the emulsion, thereby reducing the overall heating and permitting the projectionist to throw bright, clear pictures on the screen.

My friends and I enjoy INTERNATIONAL PROJECTIONIST very much and consider it indispensable to projectionists. It covers the projection field impartially, giving publicity to a wide range of new developments and furnishing information of great practical value.

In Rebuttal

McAULEY HEAT-FILTER UNIT

By CHARLES HAHN
J. E. McAuley Manufacturing Co.

THE comments by Mr. Schanz are most interesting, even though, to my mind, they miss by a wide margin the salient features of my article. True, there do exist disagreements between American manufacturers as to the most effective means for cooling both the mechanism and the film, but the writer feels that this topic is not a matter of prime importance in this exchange of views.

Regarding the writer's preference for the heat-absorbing glass filter system, it would seem that Mr. Schanz also approves of such methods, thus leaving us on common ground. Apparently, Mr. Schanz has misinterpreted the method we employ in utilizing these glass filters —which may be the writer's fault in not giving a more clear word-picture of the setup. Mr. Schanz states:

Arrangement of Filters

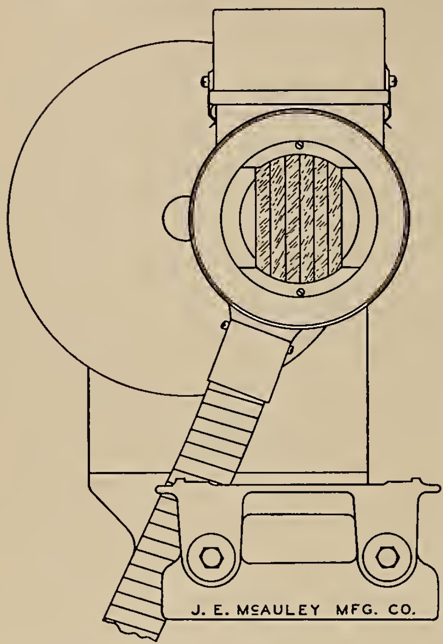
"Why did not Mr. Hahn recommend that only one filter glass of the proper thickness be used, instead of a holder which permits the insertion of as many as 6 filters? Mr. Hahn surely must be aware of the fact that the spectral absorption characteristics of several thin filter glasses placed together is exactly the same as that of a single correspondingly thick glass having only 2 surfaces to waste light by reflection."

The writer stated in his article:

"A filter glass unit consists of a metal frome with provision to hold a total of 6 strips of filter glass, each ½ x 4 inches and only 1½ mm in thickness. The strips are removable so that only as many need be interposed in the light beam as are required to prevent film damage at the particular current drawn at the arc."

Comparing these two statements, I believe it is apparent that Mr. Schanz misinterpreted my statement to mean that we insert 6 *separate* sheets, discs, or pieces of filter glass (one in *front* of the other) in a vertical position, and that each piece of filter glass was of a

THE McAULEY HEAT-FILTER UNIT



size that completely encompassed the light beam; also, that in order to obtain the adjustable feature, we removed one or more of the flat pieces or disc from the light beam.

How the Filter Unit Works

This is, of course, a misconception. The appended excerpt from a description of our Heat Filter which appeared in the SMPE *Journal* for May, 1948 (pp. 499, 500) is probably a more accurate description of the method we employ:

"The main frame of this heat filter attaches to the rear face of the rear shutter housing of the projector mechanism and provides the enclosure into which fits the frame for the filter glasses. The glass frame is supported by ears at its top, with ample room between all sides of it and the main frame inner walls to permit free passage of the air blown into this compartment from a centrifugal electric flower.

"There are 6 filter-glass strips used, each strip being approximately ½" wide. They mount in their holder vertically and in a staggered relationship to each other. Hence the air stream from the blower may pass completely over all surfaces as well as the edges of each strip of filter glass, and, in consequence, efficiently radiate the heat each glass strip absorbs from the light."

Defends American Glass Quality

Mr. Schanz also seems to be trying assiduously to sell us on the superiority of Jena filter glass. Judging on the basis of any transmission charts that the writer has been able to obtain, it does not appear that Jena glass is any more efficient than the American-made phosphate type of glass; moreover, from a practical standpoint. the manufacturer of Jena glass would not be as good a source of supply as our domestic source.

We of the motion picture industry (and I believe I can speak for the American filter glass manufacturers) are well aware of the fact that the behavior of heat-absorbing glass is not subject to individual opinion.

Field Test Results Count

The light loss figures cited by the writer are those documented by tests made in the field under good, bad and indifferent operational conditions. Specifically, no consideration was given to figures made under laboratory control, for the simple reason that actual field usage does not permit results as efficient as those possible in the laboratory. Consequently, laboratory figures are misleading when compared with actual performance data gathered in the field.

The accompanying drawing illustrates clearly the method of mounting and using our heat-absorbing glass strips.

Plan a Stereo Feature Picture via 'Natural Vision' Process

Reports from Hollywood have it that Arch Oboler, noted author and director, will start work soon on a "three-dimensional" film which will utilize the so-called Natural Vision process for both taking and showing. This process was the topic of a report in these pages some months ago.* The process works like this:

In this system, two cameras are mounted on a common base and synchronized with each other. The film from the camera on the left records the picture approximately as it is seen by the left eye; the film from the camera on the right records the picture approximately as it is seen by the right eye.

A print is made from each negative, and the two positives are then run side-by-side on two synchronized projectors, each of which has a polarizing filter over its lens. When projected on a silver screen and viewed by the naked eye, these two films look like a double exposure. But when viewed through polarizing spectacles, the two pictures are unscrambled and the result is a three-dimensional picture which recreates the impression of the depth which could be seen on the set itself as it was being photographed.

This is essentially the three-dimensional system which was employed by Jack Norling about a dozen years ago with notable success,† and again last year by the producers of the three-dimensional movies shown at the Festival of Britain.††

It is announced that such a film may be shown in "any two-projector theater;" but this statement is true only if the length of the proposed feature—and "feature" was the word used in the news release—is of such length as may be accommodated by the projector magazines and the carbon trim. Should a changeover be dictated by the length of the feature, four projectors would be required.

Any theater which does not want to use such a feature in three-dimensional form may use it in conventional two-dimensional fashion.

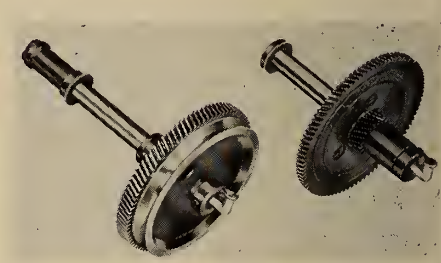
* 'Natural Vision,' Latest 3-D (?) Entry; IP for August, 1951, p. 14.

† "Stereoscopic Motion Pictures"; by J. A. Norling, IP for August, 1951, p. 12.

†† "Projection in Britain's 'Telekinema' "; IP for October, 1951, p. 11.

New LaVezzi Intermediate and Main Drive Gear Assembly

A newly designed intermediate and main drive gear assembly for standard and Super type projector mechanisms has been introduced by the LaVezzi Machine Works, No. II. The new unit, part No. RK-107, features both gears revolving on stationary studs. The fixed studs absolutely eliminate the troublesome leakage of oil into the film compartment and soundhead from these two points.



LaVezzi's new intermediate and main gear drive conversion assemblies.

Longer life of the parts is accomplished through wider-faced and therefore stronger gears, the hardened steel intermediate gear, greater bearing area, larger shafts, and generally more efficient design. Costly bind-ups are minimized by the use of oil cups in the ends of the shafts and oil wells where lubrication is most needed.

The manufacturer supplies complete installation instructions with each unit. For further details address LaVezzi at 4635 West Lake St., Chicago 44, Ill.

FILM-COOLING MEANS

(*Continued from page* 6)

hotter as the gate temperature increases. The increase slowly attains a certain maximum level beyond which it never goes.

The additional fact that film having dye images (Technicolor) suffer little from irradiative effects and yet wind up almost as warm as an ordinary black-and-white film is also indicative of conductive heating. (Dye images transmit infrared rays instead of absorbing them as a silver image does.)

'Conductive Heating' Inclusive Term

The term *conductive heating* is more inclusive than it may seem at first thought. It includes, for instance, the *radiation* of heat (invisible infrared) from hot metal parts to film which comes into close proximity with, but does not actually contact, those parts. Accordingly, film exposed to the "black heat" of a hot aperture plate or light shield gets hot in exactly the same way that one's hands can get hot by holding them over a stove without actually touching the metal.

Conductive heating is banished by water-cooling the gate, just as in the Ernemann. It is interesting to note, however, that velvet film runners are supplied with the Ernemann. These are intended to be used only with new prints, especially unwaxed ones, in order to avoid "sticking" and the attendant evils of jumpy pictures, emulsion deposits on runners and tension shoes, and torn sprocket-holes. Many projectionists, however, use the velvet runners with all prints as a matter of course, claiming that their use provides an additional safeguard against conductive heating. (As if that were necessary with a gate already cold!)

Irradiative heating effects depend only on the radiant energy output of the arc-lamp and the length of time each frame of given area is flashed, or exposed, to the light. Conductive effects (including "black" irradiation) depend on the length of the gate, the temperature of the gate parts, their thermal conductivity, and the length of time any part of the film remains in the gate.

German Conditions Different

German projectionists are divided in their opinion of glass heat filters. On the whole, they are indifferent to them. "The Ernemann," argue the rank and file of German projectionists, "simply does not need heat filters. Why throw away 5 or 10% of your screen illumination when the mechanism and film are cooled satisfactorily by air and water methods?"

While filters *are* used with many

Ernemann installations, this common argument is perfectly valid from the standpoint of the average German projectionist's working conditions. His theater is small, and his screen is amply illuminated by a low-amperage, high-intensity arclamp. But the writer cannot help thinking that experience in an American drive-in employing 170-amp arcs would quickly convince him that air-cooling of the film is not in itself sufficient to combat the *highest* intensities of irradiation.

As the writer sees it, the necessity of using a heat filter—just *one* glass of the proper thickness and a blower to disperse absorbed heat—is an inescapable conclusion when the big babies of the arclamp family are used. In fact, the writer thinks that projectionists in the smaller theaters would actually gain light by throwing away those Pyrex pie-plate draft-deflecting glasses and using high-quality infrared-absorbing filters in place of them.

Single Filter Advocated

Why should only one filter glass of the proper thickness be used? Simply to avoid unnecessary surface-reflection losses. These losses, far more serious than light-absorption losses *inside* the glass, can be further minimized by optical anti-reflection coatings.

The Ernemann X deserves above all other theater machines the epithet "cold projector." This projector is worthy of the closest study. If the top-notch American projectors now available had incorporated into their *basic* design the *combination* air and water plus filter cooling, the Ernemann would certainly have to share its chilly throne with at least four other mighty good projectors.

But so long as one manufacturer insists that filters are the only solution of the heat problem, and another that air-cooling alone is effective, and yet another that nothing at all except water-cooling is of any use—then the heat problem still will be with us, ever and anon.

Photography Comes to America

The daguerreotype was born on Monday afternoon, August 19, 1839, in Paris. On that day the French Academy of Science, acting under government orders, held a special meeting to furnish the public with full instructions for making daguerreotypes. The secret had been purchased for the common good from the inventor, Louis Jacques Mandé Daguerre.

Just when the first photograph was made in the United States has long been a matter of conjecture. Samuel F. B. Morse, in the New York *Journal of Commerce* for September 28, 1839, stated that "the merit, I believe, belongs to Mr. D. W. Seager of this city, who has for several days had some rseults at Mr. Chilton's on Broadway." The exact date can now be established The George Eastman House has acquired a letter from Seager to the manager of the American Institute, stating that he is sending to the Institute, for preservation, the daguerreotype which he took in New York City on September 16. Unfortunately. it is not known what has since happened to the daguerreotype.

There is a picturesque story, related by the brother of George W. Prosch, a pioneer photographer in America, that just as the ship in which Seager was sailing from London was leaving the dock, a friend threw him a copy of Daguerre's instruction manual. Was it this choice, by a nameless friend, of a bon voyage gift which brought photography to America?

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New RCA Service Co. N. Y. Quarters

The New York district office of RCA Service Co. technical products division has moved to new quarters, at 155 East 24th Street, New York 10.

RCA Service Co. has singed a contract with Kallet Theatres, Inc., to provide sound service and parts replacement for 23 of the circuit's houses in New York State.

Glaser Promoted by IPC-Simplex

Appointment of R. S. Glaser as assistant sales manager of International Projector Corp., makers of Simplex X-L visual and sound projection equipment, has been announced by Arthur Meyer, sales manager. Glaser joined IPC in 1935 and has served in various capacities throughout the plant, including as an active member of the production control department. In 1946 he was transferred to the sales department, serving there until his present appointment.

W.E. Newsreel Recorders for Air Force

Wright-Patterson Air Force Base, Air Material Command, Dayton, Ohio, has acquired from Westrex Corp. 23 Western Electric single-film newsreel recording systems with accessories. Each of these W. E. 235-D newsreel recording systems consists of microphones, amplifier-noise reduction unit, power unit, modulator, and interconnecting cables.

Features of these compact, light-weight, rugged systems are film noise reduction, low impedance moving-coil microphones, magnetically-sealed light valves, 100-mil standard density sound track, genemotor for plate supply, airplane-type storage battery power for system and camera.

Government Report

PB 102 294, *Research Directed Toward the Development of Acclimatized Silver Halide Film,* 66 pages including photographs, graphs and charts; sells for $8.75 in photostat, or $3.00 in microfilm form. Address orders to the Library of Congress Photoduplication Service, Publication Board Project, Washington 25, D. C.

HEAT-TRANSMITTING MIRROR

(*Continued from page* 17)

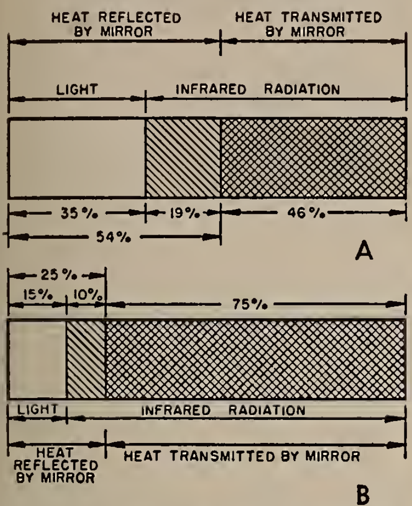

FIG. 6. Distribution of energy by reflection and transmission using heat-transmitting mirror: *A*, high-intensity carbon arc source; *B*, incandescent-lamp source.

transmits more than two-thirds of the unwanted heat due to infrared radiation. It transmits nearly half of the total radiation with a loss of less than 10% of the visible light.

When used with an incandescent source, the performance of the heat-transmitting mirror is even more impressive. In this case, 75% of the total energy of the lamp is transmited through the mirror with a loss of less than 10% of the visible light.

A gas-filled incandescent lamp operating at a color temperature of 3000 K radiates about 15% of its energy in the visible spectrum between 400 and 700 mμ. Nearly 85% of its energy is radiated in the infrared region between 700 mμ and infinity.

The second chart in Fig. 6 shows how the heat-transmitting mirror performs when the light source is an incandescent lamp. About 88% of the unwanted heat energy due to infrared radiation is removed by the mirror. Seventy-five percent of the total heat energy is removed, with a loss of less than 10% of the visible light.

Various Arrangements Possible

The heat-transmitting mirror might be used in a number of ways to reduce the temperature of the film as it passes through the gate of a motion picture projector. Fig. 7 shows an arrangement in which multilayer films replace the usual silver reflecting layer on the convex surface of the reflector in a motion picture projector. The glass reflector shell, *C*, has its convex surface, *A*, coated with the evaporated films which transmit a large part of the heat and reflect most of the light.

A corrugated metal shell, *B*, encloses

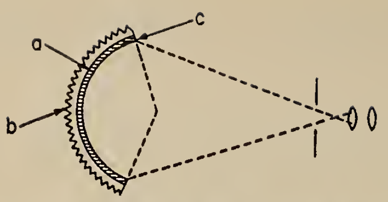

FIG. 7. Sketch of projection optics using a heat-transmitting film on back surface of reflector.

the back of the reflector and is spaced away from the evaporated films. This metal shell serves the double purpose of protecting the reflecting surface from contamination or mechanical damage, and absorbing the radiation so that the energy may be dissipated by convection currents.

One possible disadvantage of the scheme shown in Fig. 7 is that elaborate and expensive equipment might be required to evaporate thin films with the required uniformity on the convex surface of the reflector. This disadvantage would be overcome in the arrangement shown in Fig. 8. Here the multilayer film, *A*, is on the concave surface of the reflector where it would be relatively easy to obtain the required uniformity.

Protective Shell Utilized

In order to protect the surface from contamination and mechanical damage, a thin-glass shell is placed in front of

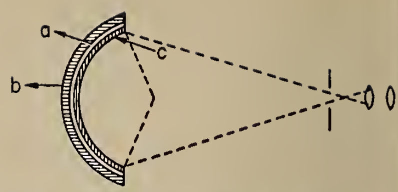

FIG. 8. Projection optics using heat-transmitting film on front surface of reflector, protected by another glass.

the reflector and in contact with it all along the rim. This shell might be removed for cleaning, and it could be replaced when its concave front surface gets badly pitted by hot particles from the carbon arc.

Still another arrangement of the heat-transmitting mirror is shown in Fig. 9. The evaporated films, *A*, are placed on the back surface of a flat plate of glass, *C*. A thin, corrugated-metal housing encloses the back of the reflector and keeps it clean and free from mechanical damage. The heat is dissipated by convection currents of air flowing past the thin metal housing.

This arrangement, with a single heat-transmitting mirror and a normal silver-backed concave mirror, requires a right-angle bend in the illuminating system. If this is a disadvantage, it could be overcome by the use of two heat-transmitting mirrors like those shown in Fig. 9, arranged to make an offset system with two right-angle bends. This would result in a two-stage heat filter which would be even more effective than shown by the charts in Fig. 6. If desired, a two-stage heat filter could also be obtained by using a combination of the systems shown in Fig. 7 or Fig. 8 with the system shown in Fig. 9.

1. J. Strong, "On a method of decreasing the reflection from nonmetallic substances," *J. Opt. Soc. Am., 26:* 73-74, Jan. 1936.
2. C. H. Cartwright and A. F. Turner, "Multilayer films of high reflecting power" (Abstract), *Phys. Rev., 55:* 1128, June 1939.
3. G. L. Dimmick, "A new dichroic reflector and its application to photocell monitoring systems," *Jour. SMPE, 38:* 36-44, Jan. 1942.
4. G. J. Koch, "Interference mirrors for

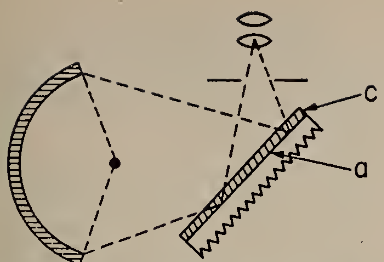

FIG. 9. Flat heat-transmitting mirror used in beams from silvered reflector.

arc projectors," *Jour. SMPTE, 55:* 439-442, Oct. 1950.

DISCUSSION:

Frank Carlson: What is the maximum temperature the mirrors will stand?

P. J. Herbst: No tests have been made to determine the maximum temperature the mirrors will stand. No damage has resulted from tests using the mirrors in the beam from a high-intensity arc.

D. B. Joy: Has it been found that these films will stand up satisfactorily in ordinary projection lamps used in motion picture projection?

Long Life Indicated

Mr. Herbst: The mirror has been subjected to the beam from a high-intensity carbon arc, focused to about a 3-inch diameter spot, for several hours without damage. However, actual life tests have not been made on the mirrors.

Mr. Joy: The motion picture industry should be grateful to you people for having done some work along these lines. We are faced with a very practical and immediate problem of trying to keep the heat down on the film, while we are trying to force a great quantity of light through the film in outdoor theaters. Therefore, anything along this line, coming at this time, will be of great help in giving us better movies, and that's the thing we want.

Mr. Strickland: If you don't have the shield in front of the mirror, and you get pretty well pitted, does that have the tendency to lower your light?

Mr. Herbst: You mean the dichroic on the front of the mirror next to the carbon arc?

Mr. Joy: Thats right.

Mr Herbst: This would not be recommended. The dichroic surface should be protected.

FILMING 'QUO VADIS'

(*Continued from page* 12)

tremely well done. The photography of this sequence is one of the highlights of the picture.

The 'Blue-Backing' Method

Several important scenes called for background projection; but as we had no equipment for this, the scenes were accomplished by employing the "blue-backing" method introduced by Tom Howard, of M-G-M's London studio. His method of photographing and combining in the printing of background and foreground action is said to be the best in the industry. As an example of how this method was used to make a composite scene showing Robert Taylor driving a fast chariot, without having to do this from a travelling camera car, we made a running background shot in the same manner as we would for a normal background projection shot. Then Taylor, in a chariot, was placed before the camera, with a blue backing, brightly lit, behind him, and his action of driving the chariot was photographed.

Back in London, Tom Howard combined the two negatives in optical printing to achieve the pictorial effect desired. Those who have seen this footage on the screen marvel at the great depth of focus and quality achieved.

When lighting the blue backing for

day foreground action, we achieved a smooth overall 750 candles; the secondary shot of the foreground action was then lighted for the same level. Where a night effect or low key effects was desired in a blue-backing shot, the backing was lighted as for day shots, *i.e.*, 750 candles, and the foreground action level was reduced to 400 foot-candles. A register and definition chart was photographed before each take.

Tremendous 'Extra'—Task

Recruiting and directing the tremendous crowds of extras that were used in the picture is a story in itself. Costuming and making up 14,000 extras was not child's play. Finding this many Italians and getting them on the set was the task of Mel Ballerino, sent over from Hollywood to supervise casting. There was no "Central Casting Bureau" in Rome to which Ballerino could telephone his requests for extras. So great was the picture's cast requirements that a large segment of the Italian population had to be recruited for the picture in a most novel way.

Italian motion pictures have been noted for their large mob scenes. Instead of central casting offices, there have come into existence in Rome men skilled at getting mobs of Italian people to work in films. These men are called "Capo Grupos"—group captains. To get mobs of extras for "Quo Vadis," casting director Ballerino would contact the Capo Grupos, who would then canvass their neighborhoods or their lists and round up the required number of people needed for the next day's shooting. It was the Capo Grupos' responsibility to see that their respective groups arrived at the set or location on time and ready to work.

The people under each Capo Grupo's jurisdiction were given a sleeve band having an identifying mark to wear. When preparing the extras for appearance in the mob scenes in Nero's Arena, our assistant directors had maps prepared showing the seating arrangement in the arena. Little markers with numbers had been placed in sections of the arena, and these sections were marked on the maps. Thus, each Capo Grupo would be given certain sections of the arena to fill, and he would direct his charges to the section marked with the numbers designated. It was a very efficient system, completely free of confusion.

When it came time to pay off the thousands of extras, the money was merely turned over to the Capo Grupos, who in turn paid off the people captained by them. The fine cooperation of the "Capos" and people alike resulted in many wonderful scenes.

A Laugh or Two, Too

As I look back on this assignment, many humorous incidents come to mind. I have to laugh every time I think how we had to send most of Nero's Praetorian Guard to the barber shop each day for shave. And then there was the situation that arose with the women dancers from the Rome Ballet. Before we could shoot the dance numbers in Nero's banquet scene, we had to send all 40 of the women to the barber shop to get the hair shaved from under their arms. Italian women just don't believe in such things!

One day, when on location, members of the Italian electrical crew were about to go out on strike because the unit manager had substituted bottles of Coca-Cola for the customary wine in their lunch boxes. On still another day, one of the fighting bulls broke loose, and chased everybody on the lot indoors. Not until a squad of police arrived in a jeep and armed with machine guns, was the rambunctious bull quelled in hilarious action reminiscent of the old Keystone Comedies.

One day we noticed that the horses drawing Bob Taylor's chariot seemed to have changed color. After intensive questioning of their attendant, it was revealed he had substituted different horses. Someone had offered him more money for the use of the regular team in a private funeral procession scheduled for that day!

These are just some of the lighter moments in the making of a truly great production—a production concerned with the teachings of a man who taught goodness and mercy and who was crucified almost 2,000 years ago. I consider it an honor to have photographed it.

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MARCH 1952

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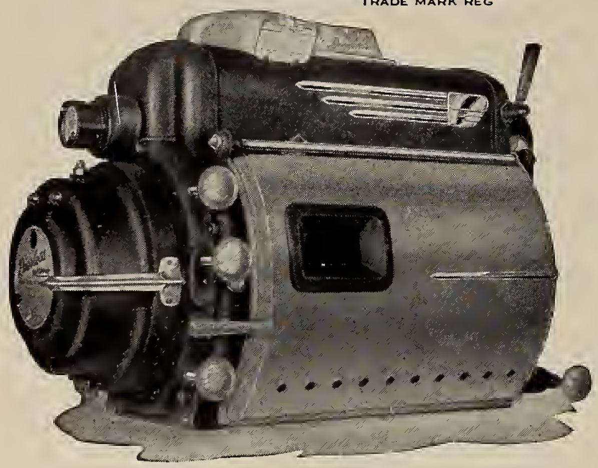

"HY-AX" ARC MAGNET

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More light at 40 to 70 amperes than ever thought possible. . . . Equals and excels any reflector lamp to 85 amperes, whether they be unapproved water-cooled or resurrected "Hi-Lows". . . . Highest ratio of *honest* screen lumens per arc watt. . . . At 70 amperes, using an accurated Glass Hy-Lumen Reflector*, with a projector having an efficient revolving shutter, it develops the maximum screen brilliance that can be used without a heat filter at no risk of film damage. . . . Operating costs under these conditions are far below that of 85-ampere lamps.

Magnarc Lamps assure 80% side-to-center (SMPE Standard) screen light distribution, not a deceptive 60% or "Hot Center". . . . They are all Und. Lab., Inc. listed. . . . They are not insurance hazards. . . . They are and have been for years "The First Choice" of large and small theatres, drive-ins, and the motion picture industry.

* Similar results are *not* guaranteed if *all-metal reflectors* are used.

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It is the "Omega" for maximum screen brilliance. . . . Nothing can even approach it in *white* light volume when used with projectors that have efficient revolving shutters.

Assures satisfying projection for Drive-Ins regardless of the size of the picture, length of throw, and under all weather conditions. . . . They are Und. Lab., Inc. listed and, therefore, *not* insurance hazards. . . . Heat filter assures no risk of film-heat damage at maximum arc amperage and maximum screen lumens.

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IN THE death of Harry Sherman, the projectionists of America and all his fellow members of the IATSE have lost a very good friend and devoted champion of their welfare.

As a young officer of his Local Union and later as a high-ranking officer of the International, he worked hard, conscientiously and successfully to help advance the cause of our organization at a time when it was undertaking one of the most important expansions in its history.

While always fearless in his judgment of men and issues, Brother Sherman had a capacity for warm fellowship which resulted in wide popularity throughout his career.

We of the General Office were shocked and saddened by his death.

Richard F. Walsh

International President.

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JAMES J. FINN, *Editor*

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HARRY SHERMAN

HARRY SHERMAN, labor editor of this publication and conductor of its "In the Spotlight" department, died at the age of 57 on March 3rd after a brief illness.

Harry Sherman was known to thousands of IA members. He was formerly assistant to the International president, and president of Local 306, New York. His multitudes of friends in the International helped him and smoothed his path in his task as labor editor; he won those friends, and the respect and regard of thousands more who did not know him personally, during his many years of avid championship of the working man's interests, his forthright and unremitting endeavors in behalf of the members of his chosen craft.

He was an "old-timer" even among old-timers, for he first joined Local 306, New York, in the year 1911. His fellow-members repeatedly elected him to office in various capacities. Following a period of service as IA representative he was named assistant IA president by the then International President William F. Canavan, in 1925. Between 1926 and 1932 he worked to better labor-management relations in the post of labor relations director for Publix Theatres Corporation, a subsidiary at that time of Paramount Pictures; resigning from that post when elected president of Local 306.

His zeal for the interests and welfare of his fellow craftsmen increased through those years of service during which he developed from a labor leader to a labor statesman, seeing the broader rather than the narrower view of the endless complexities in the ever-shifting relationship between production and direction—management and labor. His deeply reasoned and incisive conclusions were often presented with vigorous effect before International Conventions and his own Local's meetings, and played a strong part in winning him his hosts of friends.

Harry Sherman was a Past Master of Dirigo Lodge, F. & A. M., an Active Member of the Society of Motion Picture and Television Engineers, Member of the 25-30 Club of New York and of the Theatrical Square Club.

Surviving him are his wife, Ruth; two daughters, four grandchildren and three brothers.

INTERNATIONAL PROJECTIONIST

VOLUME XXVII MARCH 1952 NUMBER 3

Better Film Care Improves Entertainment

The projectionist is part of an industry that is threatened both by home Tv and by shortage of film stock. Every projectionist can help this industry provide better entertainment by making sure film is not damaged in *his* projection room. Doing this also minimizes the threat of film stock shortage. Eastman Kodak Company has prepared a very useful and authoritative set of reminders to refresh the memories of all concerned. IP is glad to reproduce here a condensed version of Eastman's remarks concerning care of film in the theatre, and will in a future issue present a similar condensation of the same company's advice to exchanges.

GOOD projection, which adds patronage and increased revenue to the theater, is entirely dependent on the skill of the projectionist and the condition of the film and the projector. Satisfactory screen reproduction is not possible with a bad print regardless of how efficient the projectionist may be. Likewise, good results with a perfect print cannot be expected from faulty projection equipment. Through constant use, projector parts become worn and out of adjustment. The replacement of worn or damaged parts when needed represents a wise investment because any expenditure in this direction will improve projection and materially reduce unnecessary film damage.

While the maintenance of the projection equipment is the ultimate responsibility of the theater, the projectionist can do many things which will aid in eliminating print damage. There are, for example, various projector parts which demand frequent attention on the part of the projectionist. Film damage may occur at any one of them and may often be avoided if adjustments are made at the proper time and if damaged or worn parts are not only discovered but replaced promptly.

The following résumé covers the more important points which must be given careful attention by the projectionist if the maximum wearing qualities are to be obtained from the film.

Magazine Valve Rollers

It should be remembered that severe abrasion is often the only reason for discarding a print. It is probable that more film is scratched in the magazine valve rollers than at any other part of the projector. This is especially true for those rollers in the upper assembly, the first point of contact with the film after it leaves the feed roll. At this point, dirt, oily matter and film chips may accumulate so as to prevent free turning of the rollers or they may become so clogged that one or more of the rollers may not turn at all. The roller tracking may also develop flat spots and wear down to the point where the center of a non-turning roller is in direct contact with the film. Under these conditions, the relatively soft emulsion of a new print is very susceptible to abrasion and the scraping is frequently so deep that the emulsion is completely plowed off. Support-side scratches show up as dark lines on the screen and might be equally disturbing, particularly when they become filled with oil and dirt. With duplitized film (certain types of color prints), there are two emulsions to be damaged. Most projectionists are familiar with the objectionable red and green "rain," or deeper scratching on some of the duplitized films.

Both straight scratches, and those that weave slightly in a repeating pattern caused by uneven reel flanges moving the film from side to side, can be created in the valve rollers, although the perfectly straight abrasions are more often associated with some guided position.

Padding of Trap Doors

Occasionally release prints are encountered which give a slight flutter in the gate or trap. This produces some in-and-out-of-focus effect on the screen. In an effort to control this flutter, projectionists have been known to fasten strips of pressboard, velvet, or layers of tape between the tension pads, both above and below the aperture, thereby discouraging any forward motion of the film. This practice can cause serious support-side abrasion, particularly in the case of films having a higher positive curl than usual. Increased curl is a common condition with newer prints during dry winter months.

Abrasion Due to Positive Curl

In the case of prints having higher positive curl there is always a possibility of support side abrasion at some other point which is normally not contacted by flat film. Attention has already been

drawn to the importance of making sure that the valve rollers turn freely. Another place at which contact may occur is at the intermittent guide holder. On some projectors the center clearance at the intermittent guide holder is not great enough for films with high positive curl. Some projectionists have filed this center section to increase the clearance. This is a satisfactory solution to the problem if it is very carefully done and the surface is polished to satin smoothness after filing. If any file marks remain, however, there is the chance that these can cause even more severe damage than that caused by the holder in its original condition.

Another method which has been used successfully by a number of projectionists but which is possible only on certain makes of projectors, is to raise the lower loop slightly by threading *over* the first pad roller and *under* the second roller. When this is done, it may be necessary to readjust the rollers in such a way that there is sufficient clearance at the second roller for two thicknesses of film. This alternate threading procedure permits the film to flow onto the sprocket from the intermittent loop more easily and with less plopping of the loop than is the case when the film is threaded in the conventional manner.

Signalling Devices

Signalling devices contained in the film supply magazine which employ a small ball or roller, which rides on the emulsion side of the film, should be checked frequently for binding or wear. Such devices in poor operating condition could prove harmful, particularly on a new print when the emulsion is most susceptible to damage.

New Print Sticking

While a new print is assumed to be ready for projection, the projectionist might encounter sticking on first runs resulting from insufficient lubrication of the print. This is commonly referred to as "green print" trouble. The gelatin in freshly developed emulsion retains a considerable amount of moisture and is readily affected by heat, which makes it soft and tacky. The first point at which new film comes in contact with high temperature is at the aperture of the projector. Here the heat may soften the gelatin and causes it to collect on the tracks or shoes at either side of the aperture or at a point slightly above or below this level. It rapidly dries to a bone-like hardness.

As the new film is projected, this hard deposit continues to accumulate and offers further resistance, which may result in deep rub lines, usually along the line of perforations or in the area between the row of perforations and the edge of the film. As this resistance increases, there is the added danger of the teeth of the intermittent sprocket seriously damaging the perforations, sometimes to such an extent that the print is beyond repair.

When print sticking occurs, prompt action is necessary. Some projectionists apply oil in generous amounts to eliminate the trouble. This is undesirable. Such application covers the picture area of the film where no oil is needed and seriously impairs the quality of the projected image. A very small amount of oil on the thumb and finger, applied at intervals to the perforation area (alternating from one side to the other), before the film enters the trap or gate is all that is needed to work the film through. At the end of the run, the tracks can be cleaned to remove any remaining hardened deposit. This should be done with a damp cloth or if necessary, a copper coin—never with a hard metal such as a screw driver, knife or razor blade. A scraper fashioned from a toothbrust handle, is a handy implement for this purpose. It must be remembered that deposits will form more readily once the highly polished metal surfaces are scratched.

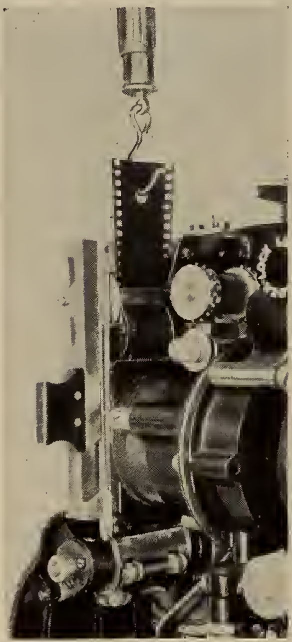

FIGURE 1
Recommended method of measuring gate tension.

FIGURE 2
Spring balance for measuring gate tension. Range 6 to 16 ounces.

Guide Rollers

The guide rollers located above the gate or trap serve as a guide for the film as it passes down past the aperture to the intermittent sprocket. If these rollers are out of line with the sprocket, the teeth will engage the film perforations off center, and the sides of the perforations may often become broken. Also, if the rollers do not turn freely, they will eventually develop ridges which may roughen the edges of the film, particularly if the film is old and brittle. These ridges, if deep enough. may even loosen the corners of poor splices. The guide roller assemblies should be inspected frequently and, if necessary, removed for thorough cleaning. The guide roller tension springs should be checked occasionally to see that they have not become so weak that proper tension is not maintained. Weak springs might allow sidewise unsteadiness, particularly with a fluttering oversize loop.

Sprocket Pad Rollers or Idlers

Sprocket pad rollers or idlers are frequently set too close to the sprocket so that they ride the film and cause marking and creasing. If they bind on the shaft, rubbing will occur at the side of the picture or possibly into the sound track area, particularly in the case of new prints. Such rub marks in the sound track area can seriously impair the sound reproduction quality. They generally cause frying noises and any picked-off spots which occur at regular intervals will result in "motorboating," although it is also true that the latter effect might often be caused by a printing defect.

If roller spacing is too great, the film may jump the sprocket, especially at a stiff splice. The generally accepted setting is at the point where the idler can still turn freely with two layers of standard thickness film on the sprocket. To insure free turning, the rollers should be removed occasionally so that the shaft can be cleaned of any gummy deposit, then lubricated slightly. On reassembling and resetting, it is important to make certain that there is no binding between the roller and sprocket teeth. It is also advisable to check the lock nut on the adjusting screw periodically.

Trap or Gate Tension

One of the principal sources of film damage is excessive tension exerted on the film by the springs in the gate or trap. Some projectionists judge the tension by merely pressing on the pads, checking one side, then the other. As far as is known, there seems to be no generally accepted standard setting for any given projector. The results of tests made in the Kodak Research Laboratories on various projectors and over a long period of time, indicate that complete, equalized trap tension in excess of 16 ounces is unnecessary and only

(*Continued on page* 11)

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MAKE "A"	Present screen—Not being made yet
MAKE "C"	Present screen—Not a direct system, requires film processing
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AS TO MAXIMUM THROW

MAKE "A"	Equal of a projector—Not being made yet, not an instantaneous or direct system. Requires film processing
MAKE "D"	Equal of a projector—Not a direct system. Requires film processing
MAKE "C"	Limit of a 16 MM projector—Not a direct system. Requires film processing
MOTIOGRAPH	150 FEET
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MAKE "F"	25 FEET
MAKE "G"	25 FEET
MAKE "H"	12 FEET

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increases the wear on the film, while settings as low as 6 ounces appear, in some instances, to be sufficient to give a steady screen image. It would seem from these tests that the tension should fall somewhere within the range from 6 to 16 ounces.

The proper pressure will, of course, depend upon the projector used, the length of time it has been in service, and the type of surface treatment the film has received. The projectionist does not usually know what the tension might be for his projector, since he is not ordinarily faced with the necessity of checking it when the equipment is in a smooth-running condition. He should, however, be familiar with the method of measurement.

Tension Testing

The proper method of making a tension test is illustrated in Figure 1. To determine the total trap tension, a full width piece of reasonably new film of standard thickness and free from oil is placed in the trap or gate of the projector. The test should be made on a *cold* projector to insure uniformity. Care should be taken to see that the perforations are not engaged by the intermittent sprocket teeth and that the film is held properly in place by the tension shoe before proceeding. Using a small, graduated spring balance, such as the one illustrated in Figure 2, which has been fastened to the film, an upward pull should be exerted slowly until the film just starts to move. If the film appears to stick at the start it should be moved slightly and the operations should be repeated. If the tension is found to be above 16 ounces, the tension should be reduced so that it falls within the range from 6 to 16 ounces, preferably near the lower end of the range. The projector should then be checked for steadiness of the screen image.

Tension Adjustment

Tension adjustment on the newer type projectors has been greatly simplified. Centralized pressure exerted on the pads by cone-shaped springs has eliminated practically all of the difficulties previously experienced with double-pronged finger-type springs. Vertical unsteadiness may often be traced to an accumulation of dirt at the base of the intermittent sprocket teeth, rather than to low trap tension. Bands on new prints from the exchange usually carry a sticker, noting that it is a new print or that the tension should be reduced, but in the case of many older type projectors still in use, this means that the double-pronged springs would have to be removed and bent by hand. These springs would have to be bent back again for use with older film. Since they were never intended to stand such repeated bending, it is advisable to adjust them to give the minimum tension which will give reasonably good steadiness with all prints.

FIG. 3. New sprocket tooth (above) in perfect condition, and (below) normally worn tooth on sprocket that is still in serviceable condition.

Tension on Upper Magazine Shaft

Proper adjustment of the spring tension on the feed spindle is important. If set too loosely, the film may come from the feed roll with a jerky motion. This is especially noticeable when the roll is loosely wound or if a bent reel is used. and is particularly bad for film in a noticeably worn or dried out condition. If the tension is too tight, the pull on the last forty or fifty feet might be sufficient to cause serious perforation breakage, more so if a small-hubbed reel is used. It is not at all uncommon to lose the upper loop or for the film to break under this strain.

Intermittent Film Guide

Considerable sprocket and film damage may be attributed to improper setting of the intermittent film guide or shoe, the intended purpose of which is to hold the film snugly against the sprocket. The older type of guide holder can easily become sprung if excessive upward pressure is applied in attempting to remove a snug-fitting trap door from the older type holder. When replacing such a door or plate, care should be taken to see that it is seated properly, otherwise the sprocket may be badly damaged.

A loose-fitting holder should also be repaired, since this might allow the sprocket teeth to strike the inside walls of the guide due to the slightest side motion. It has been common practice to deliberately bend the older type guide holder by hand, either to insure better contact of the film with the sprocket, or to eliminate the "clicking" due to contact with the teeth. Improved design and construction and the two-stud trap door locking arrangement on newer projector models has greatly reduced the possibility of trouhle from this source.

Some projectionists prefer to use a light guide spring, since they claim it is easier on the film and allows stiff splices to pass with less effort. Others insist that heavier pressure at this point gives a steadier picture, even though the trap tension might be lower than usual. Instances have been noted where two of the newer cone-type springs were nested together and used as a single spring in order to obtain heavier pressure against the film at the sprocket. It is obvious, however, that if the pressure at this point is unnecessarily high, the film wear will be greater and the sprocket may become rimmed in a short time.

Bad Sprockets

It is highly unfortunate that intermittent sprockets are frequently kept in service until they develop pronounced cuts or become otherwise so badly worn as to cause serious perforation damage. This is particularly true if the trap tension is excessive or if poor guiding allows the bad teeth to strike the perforations noticeably off center. Although present day sprockets are hardened in order to give longer service, they do not endure forever. Yet sprockets are often kept in use after the teeth have become so badly damaged that pieces of film are torn from the pull-down edges of the perforations. Even the lesser flaws in worn sprockets result in noisy operation, since they prevent the film from leaving the sprocket freely.

Sprocket teeth which have knife-like edges resulting from contact with the inside walls of the metal guide, cause the small straight cuts parallel to the edge of the film. extending downward from the pull-down edges of the perforations and well in from the corners. These small cuts quickly develop into more serious damage which can soon result in complete breakdown. Figure 3 shows a

(*Continued on page* 12)

FIG. 4. Severe conditions of wear found on theatre sprockets that had been kept in service after they were no longer serviceable.

new tooth and the typical slightly curved face cut commonly seen on normally worn sprocket teeth. Figures 4 and 5 illustrate the more severe conditions of wear found on sprockets that had been kept in theatre service far too long.

0.943-Inch Base Diameter Sprockets

A great deal of work has been done by the motion picture industry which has shown that the projection life of film is considerably prolonged if the intermittent sprocket is at least as large or larger than the size required to give perfect mesh of the sprocket with the film being driven. Obviously, the conditions for perfect mesh of the film with the sprocket are intimately associated with the shrinkage of the processed film. In recent years, the shrinkage characteristics of motion picture films have been greatly improved, so that a sprocket of greater base diameter is now preferable to the 0.935-inch base diameter intermittent sprockets previously accepted.

In 1947, an intermittent sprocket having a 0.943-inch base diameter was approved by the Society of Motion Picture Engineers and the American Standards Association. Careful laboratory tests as well as comparative tests in many theaters over several years have shown that this new sprocket gives longer film life and less sprocket wear than the older 0.935-inch base diameter sprocket. The new sprockets are now being supplied as regular equipment by a few projector and parts manufacturers and it is expected that the new standard will soon be accepted universally.

Even the new sprocket does not fit present day low shrinkage films perfectly but it does approach this desirable condition. It has been chosen as the best available within the limits of designs that have been proven by extensive trade usage. It is, however, quite possible that further work and further improvements in film may suggest a still larger diameter sprocket at some future time.

Film Loops

Excessively large loops not only result in noisy operation and in some instances sidewise unsteadiness, but may also allow the emulsion side of the film to rub against metal surfaces. The sound synchronization is also affected by an oversize intermittent loop. The loop should be only large enough to prevent the possibility of binding.

Take-Up Tension

The take-up adjustment should be checked from time to time to avoid unnecessary damage to the hold-back edges of the perforations. Excessive pulling at the hold-back sprocket can be detected by a pronounced "singing" sound and might be caused either by oil on the friction disc or by improper spring adjustment, particularly on older type equipment. If the tension is made too great in an effort to avoid the possibility of loose winding at the end of a large roll, serious damage to the hold-back edges of the perforations in the first part of the roll may occur.

The hold-back sprocket should be checked occasionally for any signs of premature wear. If such wear is found, the take-up tension should be examined and re-adjusted to minimum setting for correct winding.

Automatic Rewinds

Automatic rewinds should be checked for proper alignment. If the flanged and tracked control roller is cocked slightly either vertically or horizontally, undue strain will result on one edge of the film, particularly if the tension is excessive and if there is binding against a bad reel flange.

Hand winding, however, seldom gives the smoothly wound roll obtained by motor winding unless the film is cor-

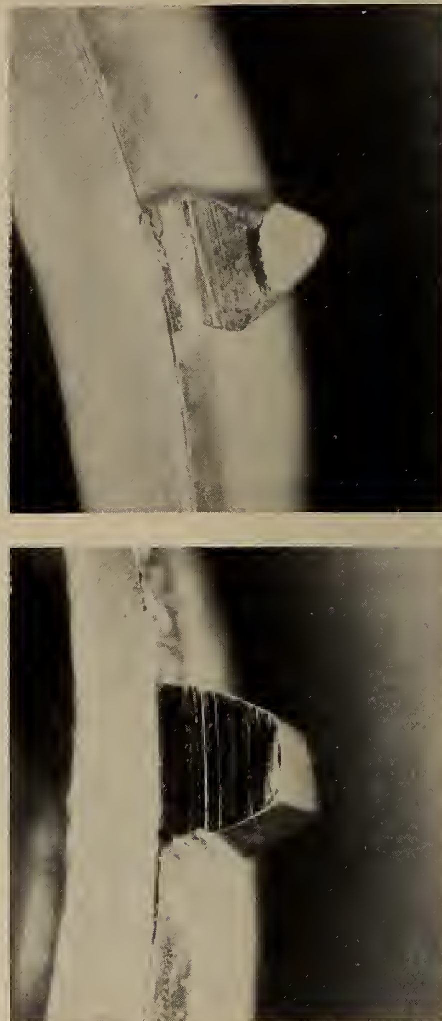

FIG. 5. Other film-ruining profiles ground into sprockets that were kept in service far too long.

rectly guided to the reel. Film edges which protrude from the reel after poor winding usually break off in small or large sections when the roll is forced into the case, or later, during shipment.

[TO BE CONTINUED]

Annual Kodak Wage Dividend

Wage-dividend day (March 7) at Eastman Kodak saw checks totaling about $20,000,000, the largest total sum in the 40-year history of the plan, go to about 49,000 Kodak men and women in the United States. Eligible persons received $27.50 for each $1,000 earned at Kodak during the five years 1947-1951. The payment brought the total U. S. distribution since the plan was begun to approximately $144,500,000.

Kodak started and has continued the plan in recognition of the part its men and women play in the success of the company. The wage dividend must be voted by the board of directors and is based on the cash dividends declared on the common stock during the year. It does not affect wage rates.


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Arclamp Generators

By ROBERT A. MITCHELL

I. Genesis and Theory of the Dynamo*

WITH the single exception of 96-cycle A. C. generated for Cyclex arclamp units (a system not too widely used) all projection arcs are operated on D. C. The advantages of D. C. over A. C. in this application are obvious. The periodic reversal ot A. C. current-flow causes the energy of the current to be divided equally between the two carbons, forming two craters, only one of which furnishes light for projection. Moreover, the flicker, unsteadiness and the noise of an arc operated on 50- or 60-cycle A. C. are undesirable.

Appropriate devices for converting the A. C. of the power mains into D. C. of proper voltages for the operation of projection arcs are therefore a necessity for modern motion picture projection. There are three types of current-conversion devices: rectifiers, motor-generators, and rotary converters.

Rotary converters are machines incorporating synchronous motors rotating in exact step with the A. C. fluctuations. By means of commutators, the line A. C. is periodically reversed so as to furnish D. C. Although rotary converters are widely used as power supplies for trolley and subway lines, they have not found favor in theater work. The relative merits of rectifiers and generators have provoked much discussion—each has its ardent supporters.

Performance Characteristics

In general, motor-generators are more rugged and dependable than most types of rectifiers. Rectifiers, however, are lighter in weight and more easily installed. But generators deliver current which is practically independent of line-voltage variations; while the D. C. from rectifiers is merely A. C. "straightened out," leaving the arc subject to line-voltage variations.

The filter circuits of many rectifiers unfortunately fail to remove all A. C. ripple. Specially designed 6-phase rectifiers reduce the ripple to a minimum, yet flickering of the screen light appears where the frequency of the line A.C. is upped from the international standard of 50 C. P. S. to 60 C. P. S. This trouble, which would not be experienced with motor-generators, is due to the interaction of ripple in the rectified current with the 48-cycle light pulsation produced by the revolving projector shutter.

Current Ripple Content

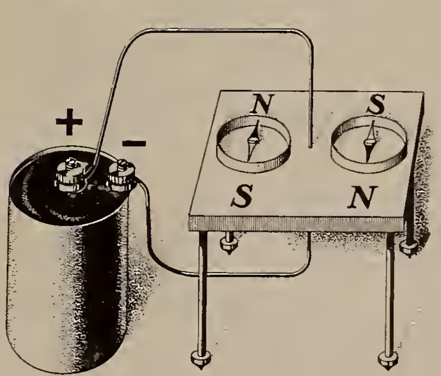
Whenever D. C. having a 50-cycle ripple powers the arc, only two light-beats of small amplitude occur each second. The frequency is so low that the faint beats are invisible. But when a 60-cycle ripple is present in the arc current, the number of beats per second is 12. Even though the amplitude of the beats is no greater, the frequency is high enough to cause noticeable flicker in the picture.

Generator and rectifier units are about equally efficient; but generators are better able to handle temporary overloads, as for example, when an arc is struck. Although the first cost of a good motor-generator is higher than that of a rectifier, maintenance costs are trifling, scarcely more than a dollar or two per year. Rectifiers of the tube type require rather frequent tube replacements, but stack (dry-disc) rectifiers, if guarded against burn-outs, last almost indefinitely. Rectifiers are comparatively silent in operation.

Generator Production of D. C.

How does a generator produce D. C.? The answer lies in the principle of *electromagnetic induction*. This principle is the heart of A. C. generators (alternators) as well as of D. C. generators (dynamos). Alternators and dynamos are very much alike—the chief difference being the manner of collecting the induced current. Also, in large alternators, the current is induced in stationary coils by revolving field magnets.

FIG. 1. LABORATORY DEMONSTRATION OF OERSTED'S FAMOUS EXPERIMENT



A wire conducting an electric current is surrounded by a magnetic field which can be detected with a compass. A compass needle always assumes a position at right angles to a line drawn from the nearest part of the wire to the needle pivot. Note that the North and South positions assumed by the compasses on opposite sides of the wire are reversed. If the connections to the battery terminals be changed, both compass needles will reverse their positions.

In the dynamo (of greater interest to projectionists) this construction is impossible. Because the currents induced in both alternator and dynamo are alternating, it is absolutely necessary in the dynamo to make use of automatic reversing-switch and current-collecting component called a *commutator*. Therefore, the dynamo's field magnets are stationary, and the "inductors" are *armature* coils which revolve in the magnetic field.

Of course, no one knows just what a magnetic field is. We do not know what a space-continuum is, or how it "warps" under certain conditions to produce the phenomenon of a "field." At any rate, magnetism exists: we can produce it in various ways, measure its polarity and intensity, and do all kinds of practical things with it. But a knowledge of its intrinsic nature lies beyond the sphere of physical science, and, possibly, outside the scope of human intellection. Electromagnetism, like our universe of space and time and energy, is one of the transcendental mysteries.

Electromagnetic Induction

The principle of electromagnetic induction, however, is simple because here we are dealing with phenomena and not with the ultimate realities behind appearances. Briefly, this principle is nothing more than the fact that a conductor, such as a coil of wire, has *induced* in it an electric pressure, or potential, whenever it is "cut" by "lines" of magnetic force. In other words, a potential, which can be measured in volts, is created by placing a conductor in a magnetic field which is either increasing or decreasing in strength. This potential is evidenced as a flow of electric current by establishing a closed circuit which allows the current to flow in one end of the "inductor" and out the other. When the density of the magnetic field is increasing, the current flows in one direction; when decreasing, in the other direction.

All this is elementary electrical knowledge; but there was a day when the world's leading scientists knitted their distinguished brows over the problem of inducing electric currents by means of magnets.

The story of events leading up to the invention of the dynamo began about 150 years ago when Allesandro Volta, an

* First of a series of three articles on the development, application and maintenance of generators.

Italian scientist, devised the "voltaic pile," the granddaddy of the modern dry-cell. Before Volta's great discovery, scientists and "natural philosophers" like Benjamin Franklin had to restrict their electrical experiments to "static electricity" obtained by vigorously rubbing pieces of glass or sealing wax with cloth or fur, and storing up the charges thus produced in crude high-tension condensers called "Leyden jars."

The electric charges in the condensers were said to be "static" because they were electricity in a motionless state. The potential which existed between the inside and outer walls of the Leyden jars was high enough to be discharged as crackling sparks resembling miniature lightning flashes. But although the voltage was high—several thousands—the current (amperes) was infinitesimal.

After discharging his jars, the early experimenter was without electricity until he had built up another charge by more rubbing of his "electrophorus," a cake of sealing wax whose electrical properties are said to have been discovered by Otto von Guericke, born in 1602. (In improved forms the electrophorus is the "Wimshurst electrical machine" of high-school laboratories and the Van de Graaff electrostatic generator used in atom-smashing experiments).

Static electricity was of no use whatever for the lighting of lamps or the running of machinery. Electricity was only a plaything and a subject of growing curiosity. It hadn't the ghost of a chance of being of practical use in the world's work until Volta's electric pile furnished scientists with heavy, continuous currents at comfortably low pressures. Nevertheless, a really big voltaic pile—one, say, of 2000 plates—cost considerably more than the average natural philosopher of the day could afford.

The Famous Oersted Experiments

Hans Christian Oersted of the University of Copenhagen was among the first to experiment extensively with the new "galvanic currents." And he made a momentous discovery. He found that the needle of a compass was affected by current flowing through a wire placed near the compass. The needle swung in one direction when placed over the wire, and in the opposite direction when under the wire. Reversing the connections to the battery reversed these two deviations of the needle. (Fig. 1).

Oersted's experiment is child's play today; but in 1820 it created quite a stir in scientific circles. It proved that the forces of electricity and magnetism were somehow interrelated.

In the same year, Britain's leading scientific light, Sir Humphrey Davy, found that bars of iron and steel could be strongly magnetized by winding coils of wire around them and passing current through the coils. Previously, magnets such as compass needles were made by stroking steel rods with pieces of *laedstaen,* or lodestone ("leading stone"), a naturally-occurring magnetic oxide of iron known to mineralogists as "magnetite."

The First Carbon Arc Light

Davy also made another discovery of interest to projectionists. He found that two rods of carbon connected to the terminals of a powerful voltage pile produced an intense white light if touched together and immediately separated by a short distance. A bow, or arc, of luminous vapor conducted the current over the gap between the ends of the rods—thus the arc-light, the indispensable projection illuminant, first shed its radiance on earth.

Sir Humphrey took as his assistant at the Royal Institution of London a bookbinder's helper by the name of Michael Faraday. In those days a scientist learned his trade by working at it. There was no need for a would-be scientist to while away the productive years of youth in academic preparation for admission to a closed corporation of belettered savants.

Faraday quickly showed himself to be Davy's equal, and this initiated a professional jealousy on Davy's part which was to last until his death. No "star," movie or scientific, loves a rival who threatens his eminence. Faraday did his best not to aggravate the situation, even though the outstanding quality of his work forced proud Sir Humphrey to swallow his pride more than once. We must not forget that Faraday got his big chance through Davy, and that Davy permitted his charge to perform experiments in the Royal Institution's laboratory despite noticeable pressure to keep young Michael in his place.

Electromagnetism in Reverse

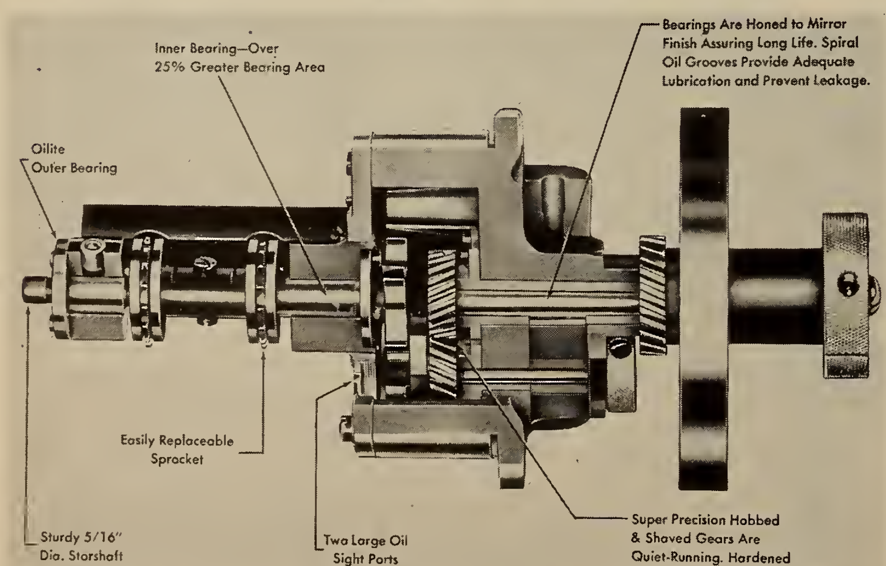
Faraday learned all he could about electricity from books and scientific reports. The problem of electricity and its relationship to magnetism fascinated him and stimulated his fertile imagination. Day and night he pondered Oersted's experiment with the compass needle and Sir Humphrey's electromagnets.

"If electricity can be converted into magnetism," he thought, "surely there must be a way to reverse the process!" He flipped the leaves of his notebook to a blank page and scrawled: "Try to convert magnetism into electricity." That was in 1822; and the electric generator was already aborning in Faraday's mind.

Countless experiments failed, but Michael Faraday beat no disheartened re-

(*Continued on page* 28)

LaVezzi's Newly-Designed Intermittent Movement



A newly designed intermittent movement has recently been introduced by LaVezzi Machine Works, of Chicago. This unit features a sturdy 5/16-inch diameter star shaft made of tool steel. All moving parts including Cam, Starwheel, Sprocket, and Flywheel Shaft and Gear are hardened for maximum life. Outer bearing is made of Oilite—the material that holds oil like a sponge and assures against bindup. The inner bearing has over 25% greater bearing area. As taper pins have been eliminated in this model, a screw driver is the only tool required to replace a worn sprocket. An illustrated brochure covering this unit is available on request to LaVezzi at 4635 West Lake St., Chicago 44. Ill.

TELECASTS

RCA Tv Shows in Berlin Mark U. S. Know-How, Ingenuity

WITH nearly a month of Tv broadcasts in Berlin, Germany, behind them, RCA Service Co. engineers are confident they can meet any challenge the future may hold. The job of setting up a complete television transmitter, two Tv studios, two microwave relays, two RCA PT-100 large-screen theater Tv systems, and more than 100 receivers is a tough one—even when given a reasonable period of time to cope with the many problems involved. Completing the job in 85 hours, and in a foreign country, was a record-breaking achievement.

But that's what was done by a crew of 23 RCA technicians preparatory to showing Tv to more than 1¼ million people in West Berlin. The programs were given with the collaboration of the U.S. High Commissioner of Germany.

Rigid Requirements Met

Especially challenging was the requirement for setting up the two theater Tv systems in out-of-door locations, where protection from inclement weather and the effects of stray light from outside sources were factors to be dealt with. Although the RCA engineers have had several years of experience in the installation and servicing of theater Tv systems in the U. S., the Berlin job presented an entirely new kind of test.

Even before encountering the language, technical, communications, and transportation problems awaiting them, the engineers faced hurdles that resulted in an unforeseen 18-day delay in getting official clearance into Berlin. When they reached Berlin, they found all available truck and automobile transportation tied up in a motor pool due to an alert which lasted for seven days.

Thirty-five tons of equipment was needed to put on the demonstration. The gear was packed and shipped from company headquarters in Camden, N. J., to Rotterdam—a rough, 8-day ocean voyage. Then, by truck and troop train, with numerous loadings and unloadings, it was hauled to Berlin.

Although the receivers came through the ordeal practically undamaged, their installation was a serious problem. The two PT-100 theater Tv systems were installed in the open in Schoeneberg Stadt Park, where RCA had one of its two specially built studios, and on Potsdamer Strasse, within a stone's throw of the Soviet sector boundary. These systems were the same as those that RCA has installed in U. S. theaters.

Structural, Electrical Problems

The home-type sets were placed at strategic locations through West Berlin. Many of the location buildings had been extensively damaged by bombing during the war. Only the first couple of floors had been reconditioned, in most cases. Often, installation men had to scale shaky, jagged columns of masonry to reach suitable elevations for mounting the antennas. When conventional communications facilities proved inadequate for maintaining contact with installation groups in different parts of the city, walkie-talkies were pressed into service. Another problem was the difference in power line characteristics between U. S. and German systems. In Berlin, the power system delivers 200 volts at 50 cycles.

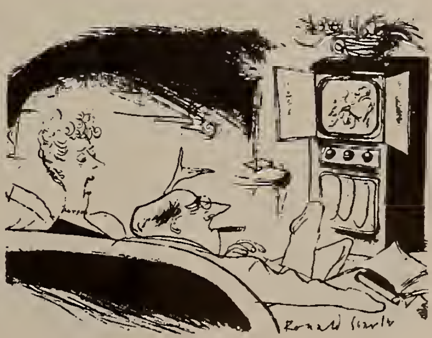
Later, interference problems arose. When the transmitter was erected and ready for testing, it was discovered that the six-megacycle wave-band would knock out one American overseas broadcast, interfere with one of the three channels of RIAS (Radio in the American Sector), and jam reception of French military police cars in their zone. RCA's audio channel also interfered somewhat with reception of calls to police cars in the West Berlin area. Finally, after many conferences, permission to turn on the transmitter was granted. Police radio frequencies were used with the understanding that telecasts would stop immediately if an emergency arose. Fortunately none did.

Problems continued to arise after the Tv system was placed in operation. Receivers located in a large Berlin park were covered with canvas to protect them from the elements. But during a cloudburst one night, after the show, they were thoroughly soaked. The next day, RCA technicians dismantled the receivers and baked the transformers and other parts under sun lamps until they were dry. The receivers were working by showtime that night.

Even the Weather Intervenes

The success with which daily large-screen shows were presented effectively demonstrated the capacity of the PT-100 theater Tv system. The bright, clear 15 x 20-foot screen images were hailed by crowds of thousands at single performances, and drew special praise from U. S. officials in Berlin, as well as officials of the Theater Guild who visited Berlin in connection with the presentation of "Oklahoma!"

As the Tv demonstrations progressed, servicing problems naturally became fewer. By the end of September, with their work successfully concluded, the engineers and technicians were able to look back on their trials and tribulations during the Berlin operations as just another interesting and challenging job in their service careers.



This Week, N. Y. Herald Tribune

"I'm disgusted. They keep showing the kind of movies that drove us out of the theater back into the home.

* * *

Tv Network Growth in 1951

Summarizing the Bell System's progress in the provision of nationwide intercity network Tv facilities, A T & T's Long Lines Department pointed out that, "during 1951 Long Lines added about 6,500 miles of Tv channels, bringing the total to over 24,000. Four cities were added to the network during the period, making available 'live' network programs to 14 stations not served in 1950. Investment in facilities used for Tv rose to $85 million.

Highlight of 1951 was the establishment of coast-to-coast service over the new transcontinental microwave radio relay system, linking Salt Lake City, San Francisco, and Los Angeles to the network; thus making nation-wide telecasts possible for the first time.

IN THE
SPOTLIGHT

Harry Sherman passed away on March 3 after a short illness. This department, which he instituted and nourished with his intense feeling for the advancement of the workingman, will be continued—as he would wish it. To those who, by their devotion to craft welfare and advancement, have contributed in boundless measure to the worth of this department, we express our gratitude. Now, as in the past, "In The Spotlight" will aim for the establishment and maintenance of the highest craft standards—a task which may be measured only by the extent of continuing craft support.

CLAIMING that the poor condition of prints received from the exchanges have made it necessary for its members to spend considerable of their own time in repairing torn sprocket holes, poor splices, etc., San Francisco Local 162 has asked exhibitors to provide extra time in the new contracts for film inspection.

We believe that immediate steps should be taken by the film exchanges to remedy a situation that is becoming prevalent throughout the country. We have received many letters from projectionists complaining about the really shameful condition of the prints they receive from the exchanges. Many projectionists, in order to prevent breakdowns in the theatres, very carefully check each print and make the necessary repairs on their own time—a job which rightfully should be done at the film exchanges.

• Our very best wishes go to Martin Goble, member of Vancouver Local 348, on his new venture as partner in the Vernon Drive-In, at Vernon, B. C.

• An aftermath of the hearing held before the NLRB last June in the jurisdictional dispute between the International Alliance and the National Association of Broadcast Engineers and Technicians was the conviction of George Maher, executive secretary of NABET, for third degree assault on Harold Spivak, who represented the IA at the hearing. Sentence was deferred until a later date.

• IA President Richard F. Walsh is the first labor leader to receive a Brotherhood Award from the National Conference of Christians and Jews. The presentation was made at the recent annual dinner held by the Conference's Amusement Section at the Waldorf-Astoria Hotel in New York City. In making the presentation on behalf of the Conference, Miss Fannie Hurst, the well-known novelist, stated that labor unions are now being enrolled in this organization's effort to combat discrimination, pointing out that "Mr. Walsh is a man who is contributing a great deal to the kind of thinking we are doing."

• William Maddocks, president of Local 570, Michigan City, Ind., was recently elected to the presidency of the Michigan City Central Labor Union.

• The National Labor Relations Board at Washington, D. C., in the first action of its kind, revoked a certification of a parent national union as the bargaining representative for a group of employes in a Chicago plant, because the Local active among the employes had not filed non-communist affidavits for all of its officers when the certification was issued. The unions involved are the United Electrical, Radio and Machine Workers of America, unaffiliated, and its Local No. 1150.

• Our congratulations to Arthur Milligan, one of the old-line members of Toronto Local 173 on his election to the office of business representative, succeeding the late Wm. P. Covert.

• H. Goldin, of Toronto, has established a complete acoustical consulting service for architects, engineers, builders and building management. This is believed to be the first full-time acoustical engineering service of its kind in Canada. The service covers the entire field of architectural acoustics, sound reinforcement, noise isolation and associated problems encountered by builders and operators of such structures as theatres, auditoria, broadcasting stations, schools, churches, arenas, music studios and multiple dwellings.

Hy was responsible for the acoustical design of all new Odeon theatres in Canada and the majority of larger theatres built in recent years by other companies. For 17 years he was on the technical staff of Northern Electric Co., where he was responsible for the installation and maintenance of theatre sound equipment. During World War II, Hy was loaned to Victory Aircraft, Ltd., to do engineering and design work in connection with military airborne

(*Continued on next page*)

IA MEN HONORED ON 25TH ANNIVERSARY OF ROXY THEATRE, NEW YORK CITY

David D. Katz (center), executive director of the Roxy Theatre, is shown presenting gold watches to four IA men who have been with the theatre since it opened on March 11, 1927. Recipients of the awards are (left): Jeff Smith, chief electrician, and Herman Ostersen, electrician, members of N. Y. Local 1; John Janitz and Frank Nealy (right), projectionists, members of N. Y. Local 306.

Projection Room Ventilation *a la* British

IMPROVED ventilation of projection rooms has ever been a prime concern of projectionists' organizations on two counts: the entrance of fresh air from the outside or through the theater ventilating system, and the exhaust of noxious fumes emanating from the carbon arc lamphouse. Data now at hand indicates that the British have contrived a rather ingenious device for exhausting such fumes, and it has the added virtue that it resists backdrafts.

But first a resume of a serious American effort to overcome this problem. Several years ago IA Local 150 of Los Angeles succeeded in having the State Labor Code amended so as to compel the use of modern ventilating means. Subsequently, however, it became evident that one serious omission in this legislation was a means for preventing backdrafts of noxious fumes, particularly when the wind was blowing in a certain direction.

The Local 150 Proposal

The Local 150 proposal for overcoming this defect, as culled from the pages of IP,* is stated briefly here:

> It has been found upon investigation that the prevaiilng wind, if of great enough velocity and blowing in the direction of the exterior arc lamp exhaust stack, forms an impasse for the exhausted gases, creating a backdraft and bringing the fumes back into the projection room.

The installation of automatic funnels or hoods at the extremities of the exterior arc lamp exhaust stacks will prevent the return of carbon gases to the projection room. These devices are similar to the funnels used on shipboard to ventilate between decks. The funnels are L-shaped and finned so that the prevailing wind may rotate them 360 degrees. They should be mounted on ball bearings to allow for ease in rotation: in this manner the funnel is turned away from the direction of the wind, making it impossible for a backdraft to occur. This is an inexpensive installation and would remedy the situation.

In drive-in theaters, in most instances, the exterior arc lamp exhaust stack, or duct, is too close to the projection room ventilation intake duct, with the result that the lamphouse exhausted gases are being drawn back into the projection room. The exhaust stacks, or ducts, should extend not less than 25 feet away from the projection room intake duct and be equipped with automatic directional exhaust hoods.

The accompanying line drawing details the ventilation setup suggested by Local 150.

Details of Ventarc Unit

The aforementioned British unit, known as the Ventarc, is described by F. E. Durban, Director and General Manager of J. Frank Brockliss (London, England) as follows:

The principle involved is that the ventilating system is manufactured as a unit to be mounted on the top of each projection lamp; the fan unit, of the turbine design, draws the air across the motor unit itself and directs the stream of air into a jet unit under pressure. The jet unit blows the air into the main exhaust chimney at great force so as to cause a vacuum behind, which induces the fumes from the arc in a controlled exhaust movement. Therefore, it is certain that the objectionable fumes which deposit themselves on the lamphouse

Arclamp mounting for Brockliss Arcvent unit.

parts and mirror generally are, by the new system of ventilation, induced by controlled draft to the open air.

Wind Direction, Velocity Immaterial

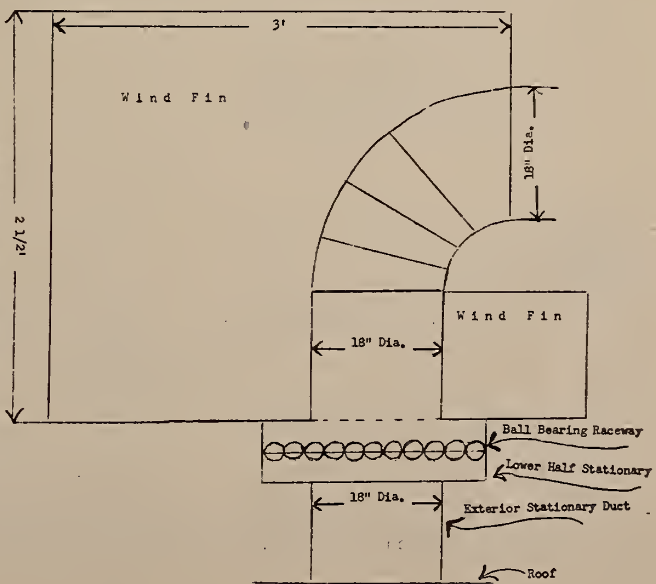
It follows naturally, also, that prevailing winds at the outside of the theatre do not interfere with this ventilation, due to the force of the jet unit in operation. It necessarily follows, also, that the Arcvent does give controlled ventilation irrespective of weather conditions and high efficiency concerning the burning of the arc, which is undisturbed by any exterior elements.

In addition, the fan unit also (which should be left running all day whetner the projection lamp is burning or not), ventilates the projection room and in the case of an accidental fire would disperse the fumes quickly from the projection room, since the fan unit is situated near the film mechanism; also, the unit being left in operation all day cools the working parts of the lamp when not in use. Thus the projection lamp parts are ready for handling without any undue heat due to the extra cooling which is induced by the system.

A Projection Room "Must"

We found that mirrors are kept very much cleaner and do not require the usual wiping. Altogether, this unit invention is being

(*Continued on page* 25)



Reproduction of a sketch accompanying the recommendations of Los Angeles projectionist Local 150 for an improved means of exhausting noxious gases from projection rooms. Details of the hookup are given in the accompanying article.

* "In the Spotlight"; IP for Aug., 1951, p. 20.

(*Continued from preceding page*)

communication equipment. After the war he organized the technical department of Gaumont-Kalee (J. Arthur Rank organization) as chief engineer.

Hy has now established his own practice. He is a member of the Association of Professional Engineers of Ontario, the Acoustical Society of America, the SMPTE, the IRE, the British Cinematograph Society, and the Physical Society of Great Britain. He has authored papers read to the SMPTE and the IRE, and has also written extensively on sound engineering and reproduction.

• Edwin Graham, Boston Local 182 and a veteran of World War II, was recently appointed chief projectionist at the West Roxbury (Mass.) Veterans Hospital.

• According to an item in the industry trade press, the New York Council of the National Association of Broadcast Unions and Guilds, AF of L, voted unanimously to oust the National Association of Broadcast Engineers and Technicians from membership, accusing NABET of "raiding" and "creating disharmony."

Stereoscopic Motion Pictures

By J. A. NORLING

President, Loucks & Norling Studios, Inc., New York

Supplementing articles of the same title which appeared in IP for Aug., 1951 (p. 12) and for Feb., 1952 (p. 9) (and to be regarded as a third installment thereof) is the appended extension of remarks as they appeared in the *Journal* of the Photographic Society of America (Jan. 1952, p. 19). Widely recognized as an authority on the stereo art, the author's stature is further enhanced by this presentation.

THE *N. Y. Times*, early in 1944, reported that Simyon Ivanov, a Soviet artist, had invented a screen having tiny squares of thousands of strands of fine wire which produced third-dimensional effects without the use of eye-glasses.[1] James Aldridge, writing on the same subject for the North American Newspaper Alliance, reported that the images reproduced through the screen were "coarse and blurred".

The article goes on to say that the original Ivanov grid system had been improved and developed in the Sgvintorgkino Studio to the point where it promised to become practicable. To quote from the article:

"The glass screen is engraved with more than 2,000 converging lines, and it is in these markings that the secret of the new screen lies. In photographing third-dimensional movies, the only alteration required on standard cameras is the addition of two or more mirrors fitted near the lenses to reflect the images onto the film."

Obviously, this appears to describe Ivanov's photographic process as being an application of the beam-splitter principle.

The article goes on to say:

"In showing the film, it is projected onto 'two or more mirrors,' instead of directly onto the screen, which reflects the shadows onto the glass screen. In turn, the lines on the screen unscramble the images, resulting in a clearer image than has hitherto been obtained in third-dimensional film experience."

Then, in October 1945, the *Wall Street Journal* reported further on the Ivanov development:

Moscow (AP)—The Soviet film industry is preparing a surprise for the world's movie fans—a special production of "Robinson Crusoe" to be exhibited on a new stereoscopic screen designed to give rounded, three-dimensional images.

Simyon Pavlovich Ivanov, the inventor, said that the screen creates an illusion so perfect that people unconsciously dodge when pictures of birds or airplanes are shown.

Ivanov said he believed the screen surpasses anything Hollywood had done to achieve realism in the exhibition of motion pictures.

On April 29, 1948, the *New York Herald-Tribune* published the following:

Moscow, April 28 (AP)—The Communist newspaper *Pravda* disclosed today that Simyon P. Ivanov, described as the inventor of three-dimensional motion pictures, had been removed from the job of scientific chief of the special studio in which he perfected the invention.

The newspaper (*Pravda*) said that I. Bolshakov, Motion Picture Minister, did not take Mr. Ivanov's work seriously, tried to picture him as a faker and publicity seeker, and finally pulled him off with the excuse that he was freeing him from his administrative duties.

Pravda went on to state:

That's how the cinema industry freed itself of the worrisome individual whose name will go down in the history of the Soviet and world cinema.

Truly, workers on the grid method of stereoscopy have a bad time when someone eventually discovers that the image don't appear satisfactory throughout an auditorium.

Parallax Stereograms

Parallax stereograms are of two principal kinds, one using a grating, or "grid," as the selecting screen placed in front of the images, and the other using a selective screen consisting of small cylindrical lens elements, lenticules, side by side and running vertically.

The "grid" system was introduced by Berthier in 1896 and was the first form of stereoscopic viewing of still pictures that did not require accessories. The grid consisted of vertical bars with spaces in between. The grid was usually made on a high-contrast photographic plate. The picture was a composite which had the two images broken up into bands, the image bands for one eye being interlaced between the image bands for the other. When the grid was spaced at the prescribed distance in front of the composite and viewed from the correct distance, the observer was able to see a binocular view.

The "lenticular" system used a selective screen sometimes registered in front of the images, sometimes directly bonded to the composite photograph. The lenticules do not cut down the reflected light as do the bars in the grid system. In one system, the composite picture is made in a single-lens camera which swings through an arc during exposure. The center of the arc is in the plane of the subject.

Lenticular systems are credited to several inventors, among them F. E. Ives and his son, Dr. H. E. Ives. Dr. Ives called his the "Parallax Panoramagram." Improvements have been been made and further developments carried out by the Americans, Vanbenschoeten and Winnek, and the Frenchman Bonnet.

The Zafiropulo Process

Another invention employing the lenticular principle is that of Jean Zafiropulo, who set out to apply it to the motion picture in particular. The process requires extremely accurate alignment of all elements in photography and projection.

The Zafiropulo process involves the use of a film containing embossed spherical lens elements in its base. Prints must have their lens elements exactly aligned with those in the negative. The lens elements must register with the greatest exactitude in relation to the sprocket holes in the film. Sprocket teeth, engaging the sprocket holes, serve as the basic registration points for picture steadiness.

Film shrinkage, which is over ¼% in the lowest-shrink film base, will have to be overcome to prevent lens-element misalignment with relation to the sprocket teeth, and in turn to prevent misalignment of the film lens-elements and the screen lens-elements.

The Zafiropulo process requires only one lens in photography, but it must be of large diameter, from 2½ to 3 inches, and such a lens must be of long focus, over 6 inches in an F:2.5 lens. This is about 153 mm compared with the 40- and 50-mm lenses most frequently used

in film studios. This long focus lens requires more studio space than is needed in conventional filming.

Several other methods have been proposed for the lenticulated (goffered) film process of movie stereoscopy. (Fig. 9). One is, in essence, an application of the "beam-splitter" principle, differing from it in that it produces a series of bands for each image. One band, for part of the left-eye image, is formed through each lenticule, and another band is formed adjacent to it for the corresponding part of the right-eye image, through the same lenticule. The lens must be operated at its widest aperture.

Lippman's "Integral" System

The process of "integral" photography discovered by Lippman in 1908 utilized a screen composed of an almost infinite number of small "lens elements" in the form of pin-holes. It affords what most who have seen it consider the ultimate in stereoscopic viewing. It differs from any other system of steroscopy in that it provides a much larger number of images in the plane of the photograph and "reduces the number of viewing instruments to zero."

But Lippman's integral photographs can be made only as transparencies, and they cannot be projected, nor can they be reproduced to supply copies that have the qualities existing in the original.

These integrated stereograms are made through a screen having a great number of pin-holes, each acting as a camera lens. No camera is used: the pin-holes serve as lenses. The screen can be a photographic image in a contrasty emulsion on the front side of a glass plate, with the photographic image produced through it on an emulsion on the back. The holes must be quite small, their size being established by the rules applying to pin-hole photography. There must be a great number of holes for every square inch, and the plates should be quite large, 8 x 10 inches or more.

Exposure is made through the pin-holes, and since the effective aperture of each pin-hole is extremely small, long time exposures are essential. They cannot be satisfactorily reproduced, hence copies are not obtainable, and the negative image has to be rendered into a positive by reversal. Viewing should be with a mirror placed so that the proper left-right attitudes of the images show.

The nature of the process excludes it from practical usefulness, particularly for motion pictures, but it is an interesting thing with which to play, and can be experimented upon by anyone having the required facilities.

A Single-Lens Camera for Motion Picture Stereoscopy

If two-strip stero films are used, such things as titles can be made by exposing one image, for the required footage, then shifting the camera to expose the other, as is done in making "slide-board" stills.

A variation of the principle can be applied to obtain stereoscopic motion pictures, especially aerial shots. The writer has made such films using only *one* camera, and making only *one* negative. Two prints were made from these single negatives and projected in interlock on two machines. However, the prints were projected with one print having its frames displaced in relation to the other's.

The number of frames displaced is governed by the plane's elevation above the ground and above the nearest object, in scenes looking straight down. Frame displacement is also governed by the ground speed of the plane. A plane flying at 100 miles per hour will cover 144 feet a second, which means that 6 feet is covered in every second for a film speed of 24 frames a second. A full reel was made during flights over New York City, the camera pointing straight down. The plane was flown at 2500 feet, and slow-motion photography of 96 frames.

A film speed of 96 frames a second with a plane speed of 100 miles per hour gives 1½ feet of advance along the course as registered by every frame. Using the equation $\dfrac{D \times d}{D - d} \div 50$, established the base of the interaxial that would result in the most startling visual effect with the least eyestrain. The farthest plane, D, the ground; the nearest plane, d, the top of the Empire State Building; and the divisor, 50, indicated an interaxial base of 40 feet and this was achieved synthetically by a displacement of one film with the other of 30 frames. Actually, a displacement of 15 frames was finally selected to give the best results.

Some stereo shots were made up in this way from stock footage taken from a plane flying over the Andes. The plane was flying about 180 miles an hour and the exposures were made at normal camera speed.

The most startling of these shots was one that included "The Christ of the Andes." This heroic statue was in the middle distance and stood out in vivid relief against the mountains beyond.

There is one thing that creates quite a problem: any unsteadiness in the airplane's flight. This comes out in the projection as a constantly changing vertical and horizontal, and sometimes rotational, displacement between the images. Such displacements existed in the films we made and had to be eliminated by optical duping methods involving a complexity of steps.

"Vectograph" is the name applied to a clear plastic sheet on which an image may be rendered in terms of varying degrees of polarization, and viewed

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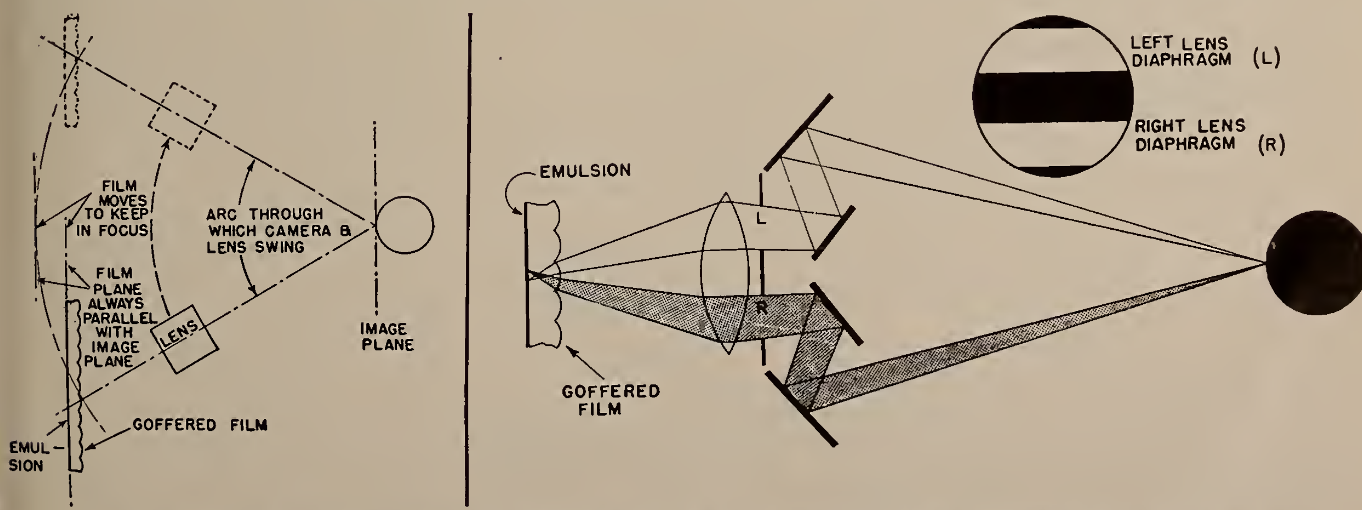

FIG. 9 (left): One type of camera for making lenticular stereograms. Right: A method of lenticular stereoscopy employing the beam-splitter principle with the addition of slit diaphragms. A detailed explanation of the system is given in the article.

LETTERS TO THE EDITOR

To the Editor of IP:

I refer to Mr. Robert A. Mitchell's article in your January issue* where he strictly advises against the oiling of friction takeup discs on lower magazines, and I quote: "Lubrication in this part of the projector will only make the takeup action uneven, tear the sprocket holes of film when the projector starts (due to lag in the turning of the lower reel), and cause the film to wind up irregularly."

I have no doubt about Mr. Mitchell getting good results from his dry discs, but in my 24 years experience with projectors I have made it a practice to keep the leather friction discs well oiled and my results have been highly satisfactory. I have no trouble with the reel jerking and tearing sprocket holes when the projector starts. My tension is even and has just the proper drag to take up a full reel of film.

My present projectors are Century and have been running for ten years. I have examined the leather friction discs this day and they are in perfect condition—the oil has had no deteriorating action on the leather, the surfaces are smooth and show no signs of wear. I feel that oil is necessary to prevent wear of the discs.

I would be glad to hear the opinion of the manufacturers as "To oil or not to oil."

J. G. JACKSON.

Capitol Theatre, Port Alberni, B. C., Canada.

* "Projectionist's Role as a Showman," (III) by Robert A. Mitchell; IP for Jan., 1952, p. 5.

Mr. Mitchell Compares Notes

Mr. Jackson's interesting comment on the oiling—or non-oiling—of takeup friction discs serves to focus attention on an important trouble-spot in motion picture projection. If the takeup fails in its function. film piles up in the soundhead. The show stops dead, and projector gears may be stripped. Before acetate films came into wide use, disastrous film fires have resulted from this cause.

On the other hand, excessive tension applied in the hope that it will provide positive insurance against takeup failure may injure film perforations, especially throughout the first 100 or 200 feet of film.

Whether "to oil or not to oil" depends on many things. The make and model of projector, for example. The old Powers required grease on one side only of the fiber disc. Motiograph projectors employ cork discs in the takeup. These must be lubricated with oil, both sides. When felt discs are used instead of leather in the Simplex-type of friction arrangement, best results are obtained when the felt discs are lubricated with a grease such as vaseline.

Projector Age Important

But a clear distinction should be made between a brand-new projector and one that has been in use several years. The possibility of oil dripping from the mechanism onto the friction clutch must also be taken into consideration by the projectionist, if not by the projector manufacturer.

Let's assume that a new leather friction disc is put into a machine having the usual Simplex type of takeup. In the first place, the leather should be dressed with Neat's-foot oil, if it has not already been prepared for use. Then one side of the leather should be roughened a bit with sandpaper and kept free from oil. The other side should be *lightly* oiled with the regular projector oil. In fact, I gave this "prescription" in two previous articles. (IP for August 1948, p. 30, and IP for April 1949, p. 10.)

This prescription is about the best that can be given *provided* that there is no over-oiling of the mechanism or soundhead, and that there are no ways for oil to leak or drip on the friction-clutch assembly. Unfortunately, this is not the case in most of our theatres, so I felt that it might be better to prescribe something a bit different in the case of *old*, "broken-in" projectors found in so many theatres.

Oil-Removal Procedure

Mr. Jackson is mistaken if he thinks that the carbon-tet washing of the oil-soaked leather discs removes *all* of the oil. It doesn't. It removes *most* of the oil, but leaves just enough to provide adequate lubrication. The discs are therefore not perfectly dry, even though they feel dry, after treatment. to the fingers. Rub a treated disc across a clean piece of paper, and an oil streak will show up. In fact, it would require many

STEREOSCOPIC MOTION PICTURES

(*Continued from preceding page*)

through a polarizing filter. The vectograph can accommodate an image on both its sides, and each image can be made to have its axis of polarization at right angles to that of the other. A stereo vectograph has the images of a stereo pair printed respectively on top and bottom of a vectograph sheet, and is viewed through polarizing spectacles with its respective windows having polarizing axes corresponding to those of the vectograph images.

In slide form, the three-dimensional vectograph can be shown in a standard monocular projector without filters. As in other systems using polarized light, silver non-depolarizing screens and polarizing viewing spectacles are required.

During World War II the three-dimensional vectograph was used by the armed services for aerial reconnaissance and for training personnel in various skills. Other uses for this novel, paper-thin stereo picture will doubtless be found. Its picture quality is excellent and its ease of handling and processing are distinct advantages for any photographic process.

Three-Dimensional Pictures and Tv

Inevitably today, any new method of visual presentation, both still and motion, can be telecast. As a matter of fact, an experimental stereo-Tv system has been at work in the Argonne National Laboratories. It permits an operator to keep a precise watch over the "hot" materials he is handling by remote control. Equipped with a pair of viewing spectacles and with eyes glued to a pair of Tv screen images which are transmitted by a binocular Tv camera, the operator does get a three-dimensional impression.

But the problems involved in presenting satisfactory three-dimensional Tv to the public may be so very great that, by comparison, the problems of introducing color Tv have been small indeed. It is anybody's guess when stereo Tv will enjoy a widespread auidence; if the history of stereo movies can provide a clue, the time is many years away.

Non-Stereo System

A sytsem which has recently been described as producing a three-dimensional effect is the Cinerama development of Fred Waller.[2] This method, requiring a multiplicity of cameras and projectors, presents a dramatic panoramic view of the scene photographed. But it is not three-dimensional at all, since it does not present a mutually exclusive image to each eye, the basic requirement of any three-dimensional system.

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1 The Ivanov system of stereoscopy was discussed in IP for April, 1941 (p. 12); December, 1947 (p. 17); April, 1948 (p. 29), and August, 1949 (p. 13).

2 "Cinerama: Super-Movies of the Future"; IP for November, 1950 (p. 10).

hours of soaking in ethyl ether, with several changes of fluid, to remove all of the oil. And I certainly do not recommend ether. It is unnecessary and much too dangerous.

Perhaps I wasn't explicit enough; but, at any rate, Mr. Jackson and I seem to disagree on the relative merits of very oily and comparatively dry leather friction discs. As Mr. Jackson may suspect, my observations were based on personal experience in a number of theatres.

In some theatres I have found the projectionists actually leaving the lower magazine doors open at changeovers and giving the takeup reel a spin with the fingers at the moment the projector motor is switched on. Just to be sure that the reel turns! And in other cases the theatre manager would tell me that the projectionist had been experiencing trouble with his takeups. In one instance I found the projection-room floor covered with film, and in another, the "assistant" was winding up the film at the rewind bench just as it issued from the projector—the takeup just wouldn't take up.

Takeup Tension Springs

In most cases of this nature I have found excessively oily (as well as dirty) friction clutches to be at fault. What would you do, Mr. Jackson, if you were called to a theatre to remedy this trouble, and found the takeup tension springs just as tight as anyone can get them, and the belts satisfactory? Leave the goop on the friction clutches and tell the harried projectionist to work out his own solution?

A special case was discussed in my January article, i.e. the case of lost loops on certain types of soundhead. The trouble was tracked down and corrected by me just as I described it; and I passed along this information via IP in the hope that other projectionists bothered in this way might avoid the prolonged process of tracking down the trouble.

I have no comment to make on Mr. Jackson's apparently satisfactory experience with oiled friction discs. It may be that he keeps his tension springs tight, or that he avoids that excess of oil that might reasonably be supposed to cause serious trouble. It would seem that he and I, using different methods, have attained the same end—perfectly satisfactory operation.

For Your Job's Sake
For Our Industry
FOR UNCLE SAM
SAVE EVERY OUNCE OF COPPER

BOOK REVIEWS

Basic Electronic Tubes, *by Donovan G. Geppert. 332 pages, 6 x 9, 273 illustrations and diagrams, with preface, contents, alphabetical index, and extensive bibliography. One in the Electrical & Electronic Engineering Series by* McGraw-Hill Book Co., New York City, 36. Price: $5.00.

Each of the 11 chapters in this book covers a different type of electronic tube in a logical and practical manner, excluding the circuit applications in order to discuss each tube more fully. For each type of tube the reader is given, first, the physical appearance and characteristics . . . then an experimental circuit diagram, together with a discussion of the tube's electrical characteristics; the physical theory of the tube, with many helpful analogies; and, finally, the mathematics surrounding the tube's operation.

Each of the tubes is discussed *in a separate chapter*, with each chapter divided into *four distinct sections.*

The book treats the basic kinds of electron tubes from a fundamentally practical viewpoint, without sacrificing essential theory and mathematics. It does not deal with circuit applications, devoting this space instead to a more complete discussion of electron tubes. The book's logical, systematic development enables one to look up a point about a tube's physical or electrical characteristics without considering theory or mathematics unless one wants to. The book progresses from the simpler to the more complex types of electron tubes, explaining such aspects as atomic theory and electron ballistics as integral parts of the theory connected with each tube.

Even though such special tubes, as photomultipliers and multi-grid mixer tubes are not taken up, the principles governing their operation are discussed in connection with the more basic electron tubes.

Tubes discussed are the high-vacuum and gas phototubes; high-vacuum thermionic diodes; high-vacuum triodes; tetrodes and pentodes; beam-power tetrodes; cathode-ray; glow-discharge; thermionic gas diodes; thyratrons; mercury-pool arc rectifiers, and ignitrons.

* * *

Sound Film Projection, *by Messrs. F. W. Campbell, T. A. Law, L. F. Morris, and A. T. Sinclair. A symposium in print by representatives of four leading equipment manufacturers in Great Britain. 332 pages, 228 illustrations, alphabetically indexed. Published by* George Newnes, Ltd., *Tower House, Southampton St. Strand, W. C. 2, London, England. Price: 30 shillings British.*

Four acknowledged experts in various callings of the recording, reproducing and acoustical corridors of the mechanical and electronic arts have joined forces to produce a symposium in print of the latest developments a la Britain in the soundfilm projection field. The work deals with five equipments well known in the British Isles: RCA, Ltd.; Gaumont-Kalee, British Acoustic, British Thomson-Houston, and the Western Electric, Ltd.

However basic may be the information conveyed hy this volume (with perhaps scant appeal to the American technician but probably of interest to our brother craftsmen in Canada and elsewhere throughout the world), it must be said, again, that these British have a knack for the marshalling and exposition of technical data which is seldom equalled and almost never exceeded by any other group of technical writers. The book is clear and concise, to the point, and actually informative by reason of its avoidance of all technical-language cliches which all too often obscure rather than reveal.

Especially valuable is the section dealing with sound-reinforcement and public address systems, a section of the sound-reproducing arts which is all too often neglected in such works. Also of particular interest is the section on "Theatre Television" which offers a clear presentation of the present state of development of this rapidly expanding art.

Theatre projection, they say, is the same the world around, and acceptance of this estimate warrants the statement that this book provides a clear exposition of the construction, installation, maintenance and operation of basic and proven designs of all sound reproducing equipment.

IA ELECTIONS

LOCAL 110, CHICAGO, ILL.

James J. Gorman, *pres.*; Frank Galluzzo, *vice-pres.*; Clarence A. Jalas, *sec.-treas.*; Eugene J. Atkinson, *bus. rep.*; Sam Klugman, Charles B. McNeill, Charles Funk, Arthur Tuchman, *exec. board*; George Karg, Claude Holmes, Edward Schulze, *trustees*; Julius Dickstein, *sgt.-at-arms*; J. Gorman, Wm. Campbell, A. Tuchman, Howard Blackwood, S. Klugman, C. A. Jalas, and E. J. Atkinson, *del. IA Convention.* (All aforementioned members were unanimously re-elected to office.)

LOCAL 163, LOUISVILLE, KY.

C. H. Young, *pres.*; Henry Kirk, *vice-pres.*; E. F. Williams, *fin.-sec. & treas.*; J. D. Hulett, *rec.-sec.*; C. Demaree, *bus. rep.*

LOCAL 219, MINNEAPOLIS, MINN.

Al Kuiper, *pres.*; Frank S. Rogers, *vice-pres.*; Joe Ellwood, *fin.-sec.*; Rudy Peterson, Jr., *rec.-sec.*; Frank Schilken, Jr., *bus. rep.*; Wallace J. Yutzy, *chairman, exec. board.*

LOCAL 488, HARRISBURG, PENNA.

Lawrence J. Katz, *pres.*; Charles J. Jones, *vice-pres.*; J. L. Bruner, *sec.*; Paul F. Paterson, *treas.*; Sam Rubin, *bus. rep.*; C. C. Rudy, E. R. Bennett, *exec. board*; Lafean Eash, A. V. Morgan, H. N. Michaels, *trustees*; Lester A. Firing, *sgt.-at-arms.*

LOCAL 570, MICHIGAN CITY, IND.

William Maddocks, *pres.*; Henry Jensen, *vice-pres.*; E. L. Holem, *sec.-treas.*; Walter Glafcke, *bus. rep.*; E. L. Holem, *del. IA Convention.*

PROJECTION ROOM VENTILATION

(*Continued from page* 19)

received by all projectionists as a very useful asset to their working conditions. We are enclosing a copy of a letter received from a projectionist who is very impressed with the capabilities and performance of this apparatus. We should also mention that we have received a further letter from a second projectionist which points out that the Arcvent unit should be installed in all projection rooms, as the most incurred for installing the units is as nothing when it is considered that human lungs cannot be bought at any price.

Our attention was drawn to this problem by the projectionist of the R.M.S. *Coronia,* who visited your office and indicated he had seen the Arcvent in operation while his ship was docked in Liverpool.

Enclosed in Mr. Durban's communication is the following letter from the manager of a British theater in the provinces:

Works Out Perfectly in Practice

We are in an exceptionally exposed position, standing on a hill with no sheltering building near and from 5-9 miles of open country in any direction. On the southern and westerly sides is a high range of hills with Salisbury Plain on the other side, so the prevailing winds come with a fierce blast and the first object to stop them is our theatre.

So we have had a fierce down-draught in the Arcvents. No mirror has been shattered through this, and it used to be the normal thing to carbon-up with the fumes from the other arc blowing into one's face: on windy days fumes and smoke would pour out of the lamphouses. I am happy to say this is now a thing of the past, and the air in the projection room is clear and dust-free. What did cause some surprise was the definite increase of light towards the end of the performance, due to non-clouding of the mirrors.

Puts His Money Behind His Faith in the Future Of the Motion Picture Theatre Industry

Modern Theatre Equipment Company's New Five-Times-Enlarged Sales Floor in Dallas.

Henry Sorenson, veteran theatre supply dealer of Dallas, Texas, has signalized his opinion of the future of the motion picture industry by opening a new supply store five times as large as his former premises.

The premiere of the new place of business was celebrated with a Texas-size barbecue that attracted over 600 Lone Star exhibitors from cities as far as 500 miles away. Additionally, Oscar Neu, head of Neumade Products, came down from New York; Fred Matthews of Motiograph came from Chicago; Jack Zern of Altec Service Corporation, A. E. Finke of Coinometer, and representatives of National Carbon and other manufacturers joined in the festivities.

Sorenson's organization, Modern Theatre Equipment Company, repairs projectors and lamps, and sells the products and services of Altec Lansing, Bausch & Lomb, GoldE, Imperial Electric, Kollmorgan, Motiograph, National Carbon, Neumade and other leading companies in the field of theatre furnishings, equipment, supplies and service. An ample supply of loan equipment enables the company to lend any type and make projector or lamp that may be needed to keep the show running while the theatre's own equipment is taken to their shop for repairs. 1916 Jackson Street, Dallas, is the location of the new, enlarged premises.

Barnett to Parent GPE Company

Herbert Barnett has relinquished his post as executive vice president of General Precision Laboratory, Inc., to join the parent organization, General Precision Equipment Corp., as assistant to the president, Herman G. Place. Other important subsidiaries of GPE are National Theatre Supply Co., J. E. McAuley Co. (Peerless lamps); Strong Electric Corp.; International Projector Corp., and Hertner Electric Co. (generators).

Mr. Barnett has been identified with the motion picture and electronic industries for more than 18 years, and he played a prominent role in the development of the GPL intermediate-film and direct-view Tv systems. He is presently executive vice president and chairman of the executive committee of the SMPTE.

For Uncle Sam—& *YOU*
SAVE EVERY OUNCE OF COPPER

Strong's "Trouper" Spotlamp

A new slide projector attachment, for use with the widely sold Trouper high intensity arc spotlamp, has just been developed by the Strong Electric Corp., Toledo, Ohio. It is especially designed for use in projecting song and advertising slides in theaters.

The intense light of the Trouper projects a clean, sharp, clearly-defined picture, even on the largest screens, with motion picture brilliancy attained on screens up to 22 feet wide. The Trouper plugs into any 110-volt outlet, with no heavy rotating equipment being necessary. An adjustable, self-regulating transformer is an integral part of the base. A trim of carbons burns 80 minutes. The arc is automatically controlled.

SMPTE Convenes April 21-25

Monday, April 21 to Friday, April 25 are the dates for the 71st Semi-Annual Convention of the Society of Motion Picture and Television Engineers, President Peter Mole has announced. The place is Chicago, at the Drake Hotel.

Program Chairman George W. Colburn reveals that sixty papers will be delivered covering motion picture projection, theatre TV, three-dimensional effects, industrial TV, motion picture sound, film processing, new motion picture screens and other topics.

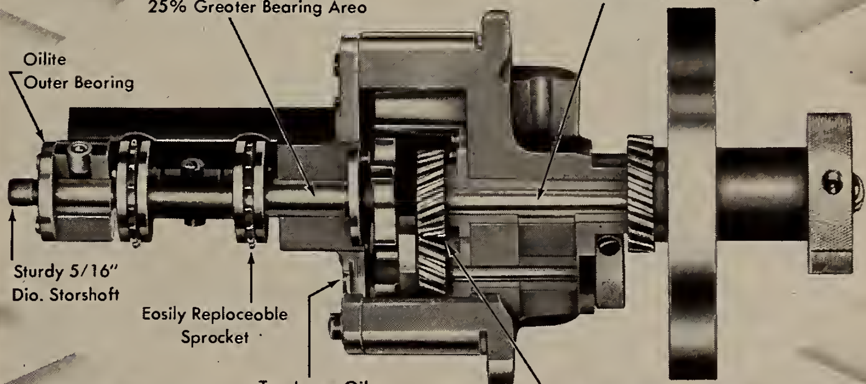
The semi-annual get-together luncheon is scheduled for noon of the 21st and the cocktail hour, banquet and dance for the evening of the 23rd.

THIS EXPLAINS A LOT

". . . in the television industry I have come across occasional cases of negligence in the care of lenses, e. g., wiping dust and grit from the elements with coat sleeves, shirt tails and grimy handkerchiefs."

So reports Marvin Jacobs, Ph.D., of the engineering department of TV station KECA, in the March, 1952 issue of *International Photographer*. Dr. Jacobs goes on to advise TV personnel to "handle the lens by the mount, *never* touch the glass. Handle the lens gently."

Were you wondering how that TV you saw last night could possibly have gotten that way?



First Copper Salvage Report

First reports by Nate Golden of the NPA on the copper-dripping salvage drive include the following figures: *three* New England theaters turned in more than 200 pounds of copper drippings to the designated Boston supply dealer; San Francisco netted $143.78 for the Variety Club Welfare Fund; Charlotte, N. C., turned in $90.30, and Minneapolis kicked in $39.20.

These initial reports point up one very important fact—the *difference in prices* paid for these copper drippings. In San Francisco the price was 17¾ cents per pound, while in Charlotte it was 15 cents, and in Minneapolis 10 cents. IP has been informed that a fair price for these drippings, which are generally reported to be 94% pure copper, would be about 15 to 16 cents a pound.

The price, of course, would vary according to the quantity of drippings offered for sale and whether the drippings were delivered to the scrap dealer or whether he had to pick them up. It is suggested that several scrap dealers be consulted before disposing of these drippings to be sure of getting the best price.

ASA Acoustical Terminology

An "American Standard Acoustical Terminology" has just been issued by the American Standards Assoc. It supersedes the 1942 edition and has a much greater scope. Among the new subjects covered by definitions are ultrasonics, underwater sound, recording and reproducing, shock and vibration, and acoustical units. It represents a joint effort by the Acoustical Society of America and the Institute of Radio Engineers.

Completion of this Standard culminates four years of work involving approval of a number of technical organizations, including, among many others, physics groups, radio-Tv manufacturers, and the SMPTE.

Shrunken Film Restorative

A process has been developed by which motion picture negatives stored for use in vaults and considered unusable because of excess shrinkage, may be reconditioned to permit making commercially acceptable prints on continuous contact-printing equipment. The treatment is called "Peer-Renu," patent pending. Peerless Film Processing Corp. is offering this treatment at 130 West 46th Street, New York 36, N. Y., and at its West Coast Branch, 959 Seward Street, Hollywood 38, Calif. The company offers without charge its advisory service on the possibility of restoring any such negatives to economic usefulness.

Extensive tests in which the company had the cooperation of skilled observers from outside its organization indicate that "Peer-Renu" will reduce the amount of shrinkage by 25% to 40%. Where this brings the shrinkage down to 1% or less, commercially acceptable prints can usually be made on a continuous printer.

ARCLAMP GENERATOR

(*Continued from page* 16)

treat from the thrilling wonderland of electromagnetism. In one of his personal letters he wrote:

"I am busy just now on electro-magnetism, and think I have got hold of a good thing, but can't say. It may be a weed instead of a fish that after all my labor I may at last pull up." Whatever may be said about intuition, Faraday *knew* that by some manner or means magnetism *could be* changed into electricity. And luck was on his side!

Faraday Constructs a Generator

On 18 October, 1831, success came within Faraday's grasp. He wound 220 feet of copper wire into a coil to form a hollow cylinder. The end wires of the coil were connected to a galvanometer, a very sensitive current-detecting meter. He then thrust a bar maget 8½ inches long into the hollow coil. The galvanometer needle jiggled. Quickly, he drew

the magnet out. Again the needle moved. Magnetism had been converted into electricity *by movement*! It became at once clear that in order to induce an electric current the coil must "cut" the "magnetic lines of force."

But even this was not enough for Faraday. Scientist that he was, he had to make sure beyond all possibility of doubt that his induced electricity was the same as that produced by the voltaic pile. So on October 30, 1831, he constructed a simple generator.

Faraday's "electrical machine" bore little resemblance to the mighty generators of today, but all the essential parts were there. It consisted of a horseshoe magnet between the poles of which revolved a large copper disc fitted with an axle and a crank. A strip of copper resting upon the edge of the disc and another upon the axle served as brushes to collect the current. When the brushes were connected to a galvanometer and the disc rotated by means of the crank, the needle was deflected to one side. A steady electric current was thus produced by a magnetic field and a rotating disc "armature."

The Magneto—the Dynamo

Substitute for the copper disc an armature consisting of several interconnected coils of wire wound on an iron core, and introduce a cylindrical commutator of separate copper segments to which the armature coils are tapped, and upon which the brushes may rest for the efficient collection of current, and we have the *magneto,* a type of D.C. generator used in certain kinds of testing and telephone hookups, and formerly for automobile ignition.

Now replace the permanent magnets of the magneto by electromagnets appropriately energized by D.C., and we have the *dynamo.* Electromagnets furnish a more powerful magnetic field than permanent magnets, and hence induce stronger currents in the armature.

A single A.C.-to-D.C. *rectifier* unit, no matter whether tube or stack, can serve only *one* arc-lamp. If two arcs are supplied from a single rectifier cabinet, it is a certainty that two separate and independent units are housed by the rectifier cabinet.

This state of affairs poses no particular disadvantage. A positive advantage lies in the fact that the falling-voltage electrical characteristics of each rectifier unit make the use of current-wasting ballast rheostats unnecessary.

The term "falling-voltage characteristic" means that as the arc current increases the voltage of the current source falls off. When this is the case, a balance is quickly attained in which the arc burns steadily with constant voltage drop (voltage across the arc), the current neither increasing nor decreasing.

One of the peculiarities of the carbon arc is that, like most gaseous electrical conductors, its resistance decreases with increasing current. This leads to a further increase of current, still lower resistance of the arc, etc.—a vicious cycle in

which all arc stability is lost. In a short time either the current-supply unit will burn up, if not protected by fuses or circuit-breakers, or else the carbons will flame along their length and spindle. The carbon consumption will be very rapid, and the screen illumination exceedingly poor.

There are also arclamp generators having the same falling-voltage characteristics as rectifiers. As each arc requires a separate generator of this type (just as each arc requires a separate rectifier), and also because motor-generator sets are expensive, this type of dynamo, although very efficient, has not proved popular. Moreover, the shorting-out switches and special changeover techniques developed in a not-too-successful attempt to permit two arcs connected in series to be supplied by only one of these falling-volt generators have not gained general projectionist acceptance.

Multiple-Arc Generator

The standard type of generator for theater projection is, instead, a "multiple-arc" generator, so called because it is especially designed for the operation of several arcs in parallel. The multiple-arc dynamo maintains over a wide range of load a *constant*, instead of a falling-voltage, characteristic. This makes possible the burning of two arcs at once, as is necessary during the changeover period.

A constant-voltage characteristic of the source, however, makes the burning of arc-lights very unstable, as previously explained. An arc demands the use of current supplied with a falling-volt characteristic. So when the multiple-arc dynamo is used as the current source, ballast resistance must be inserted in series with the arc—even though the voltage-drop occasioned by the ballast causes current to be changed into heat and wasted. Perhaps the following explanation of the action of the ballast rheostat will make the matter clearer.

Effect of "Arc-Drop"

Were ballast rheostats not used, the "arc-drop" as measured in volts would become increasingly lower (proportionately to the current) because the resistance of the arc decreases with increasing current. With a lower arc-drop more current (amperes) would pass. The carbons would spindle, and the generator would soon be overloaded to capacity if not protected by fuses. When a certain stage of overload is reached, the generator, if not destroyed by overheating, would lose its field magnetism and cease generating current.

When a ballast rheostat is connected in series with the arc, the tendency of the arc to consume more and more current simply causes an increasingly large current to flow through the ballast. Now, the ballast is a practically *fixed* resistance; *i.e.*, it is a resistance of just so many ohms regardless of the current flowing through it. When increased current flows through the ballast, its voltage-drop increases while arc-drop decreases. As a result, the current in the circuit tends to drop. Decreased current increases arc-drop and decreases ballast-drop. With a decrease in ballast-drop, the arc then gets more current, and the process is repeated.

Actually, all these increases and decreases do not follow one another in succession, but occur simultaneously to establish a perfect balance.

Ballast Resistance Important

It has sometimes happened that projectionists, in an effort to "step up" the light, have cut out too much of the ballast resistance. Even when the correct carbon trims are employed, too little ballast results in an unsteady light and faulty feeding of the carbons. The only remedies are to go back to the smaller trim and restore the ballast, or to obtain a generator having higher output voltage and current capacity.

A minor function which the ballast admirably serves is to absorb the "shock" when an arc is struck. Ballast resistors also permit two arcs powered by the same generator to be burned simultaneously for as long as 5 or 10 minutes without overheating the generator.

Whether a generator is a falling-voltage or a constant-voltage machine depends upon the windings of the field electromagnets. There are four general types of field hookups, namely, series, shunt, compound, and separately excited.

[TO BE CONTINUED]

TOP-GROSSING Film Productions of 1951

The First 4 and

From VARIETY ANNUAL, Jan. 3, 1952

1. "David and Bathsheba" . . . TECHNICOLOR . 20th-Fox
2. "Show Boat". . . . . TECHNICOLOR . . MGM
3. "An American in Paris" . . . TECHNICOLOR . . MGM
4. "The Great Caruso" . . . . . TECHNICOLOR . . MGM

From SHOWMEN'S TRADE REVIEW, Dec. 22, 1951

1. "King Solomon's Mines" . . . TECHNICOLOR . . MGM
2. "Show Boat". . . . . TECHNICOLOR . . MGM
3. "Samson and Delilah" . . . . TECHNICOLOR Paramount
4. "I'd Climb the Highest Mountain" TECHNICOLOR 20th-Fox

5 out of First 7

From MOTION PICTURE DAILY and MOTION PICTURE HERALD, Jan. 4, 1952

"An American in Paris" . . . TECHNICOLOR . . MGM
"David and Bathsheba" . . . TECHNICOLOR . 20th-Fox
"The Great Caruso" . . . . . TECHNICOLOR . . MGM
"King Solomon's Mines" . . . TECHNICOLOR . . MGM
"Show Boat". . . . . TECHNICOLOR . . MGM

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HERBERT T. KALMUS, PRESIDENT AND GENERAL MANAGER


LOEW'S INSTALLS SIMPLEX X·Ls IN 33 CITIES FOR "VADIS" SHOWING!
New York—To give patrons a true picture of the magnificent color and exciting beauty of M-G-M's spectacular "Quo Vadis," Loews Theatres announced recently that it had installed Simplex X•L Projectors in 33 cities throughout the country. Their decision, it was revealed, was based on a desire to faithfully project all the beauty and splendor which M-G-M spent so many millions of dollars to capture. Loew's officials felt only the Simplex X•L could do full justice to this lavish, eagerly awaited production.
Simplex
T.M. REG. U. S. PAT. OFF.
X•L
PROJECTORS
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PROJECTIONIST

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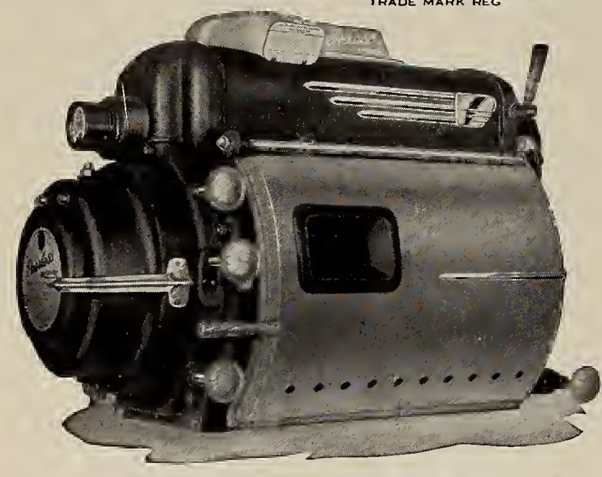
THE WORLD'S FINEST PROJECTIONISTS

Peerless MAGNARC TRADE MARK REG

1-KW TO 70 AMPS



"HY-AX" ARC MAGNET

"HY-LUMEN" REFLECTOR

More light at 40 to 70 amperes than ever thought possible. . . . Equals and excels any reflector lamp to 85 amperes, whether they be unapproved water-cooled or resurrected "Hi-Lows". . . . Highest ratio of *honest* screen lumens per arc watt. . . . At 70 amperes, using an accurated Glass Hy-Lumen Reflector*, with a projector having an efficient revolving shutter, it develops the maximum screen brilliance that can be used without a heat filter at no risk of film damage. . . . Operating costs under these conditions are far below that of 85-ampere lamps.

Magnarc Lamps assure 80% side-to-center (SMPE Standard) screen light distribution, not a deceptive 60% or "Hot Center". . . . They are all Und. Lab., Inc. listed. . . . They are *not* insurance hazards. . . . They are and have been for years "The First Choice" of large and small theatres, drive-ins, and the motion picture industry.

* Similar results are *not* guaranteed if *all-metal reflectors* are used.

"FIRST WITH THE FINEST"

130-180 AMPERES

Peerless HY. CANDESCENT TRADE MARK REG

NEW MAGNETIC STABILIZER

This modern lamp produces all the light there is. . . . It is the standard equipment of the nation's largest and finest theatres. . . . Used by 90% of the largest Drive-In Theatres.

It is the "Omega" for maximum screen brilliance. . . . Nothing can even approach it in *white* light volume when used with projectors that have efficient revolving shutters.

Assures satisfying projection for Drive-Ins regardless of the size of the picture, length of throw, and under all weather conditions. . . . They are Und. Lab., Inc. listed and, therefore, *not* insurance hazards. . . . Heat filter assures no risk of film-heat damage at maximum arc amperage and maximum screen lumens.

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INTERNATIONAL PROJECTIONIST

With Which Is Combined PROJECTION ENGINEERING

HENRY B. SELLWOOD, *Editor*

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MONTHLY CHAT

AS THIS issue of IP rides the mails, the Society of Motion Picture and Television Engineers is in convention; hearing those technical papers and discussing, sometimes heatedly, those differences of technical opinion, upon which the progress and therefore the survival of this industry ultimately depend.

The daily box office take, the weekly pay envelope, are things near and urgent. Buckle reduction in 35-mm film, or a simplified preamplifier with high gain and low distortion, seem distant. Yet without constant attention to technology, and unremitting improvement in it, eventually both the box office take and the pay envelope must dwindle to nothing and vanish.

Foremost among the pioneers of our progress, for some one-third century past, has been the Society of Motion Picture Engineers—now the SMPTE, for the Society itself must be progressive and keep up with the times. It is hard to visualize what either theatres or the projection craft would be like if all the good work of the Society were suddenly wiped out. Neither one would be recognizable.

What is not too often realized or remembered is that an immense part of the Society's work was and is being carried out by practicing projectionists with an IA membership card and an SMPTE membership side by side in the same pocket. For these "engineers" are not invariably graduate engineers with diplomas on their walls. There are and always have been several grades of membership. Anyone concerned with motion picture practices in any way, or even only interested in them, has always been eligible to join in one grade or another. The Society's work is done by men with long strings of academic initials behind their names functioning side by side with Fellows whose only higher education has been in the School of Hard Knocks.

Out of it all, valuable gains are achieved. Improvements are devised. For instance: if motion picture film no longer shrinks as much as in the past because it is now better made, then possibly the once-recommended sprocket diameter is not the most desirable any longer. Would projector manufacturers do better to substitute a somewhat larger sprocket? Here is a perfectly practical question; the Society looked into it thoroughly and recommended a change in sprocket diameters which manufacturers have adapted. The quality of the show is thereby improved; film lasts longer; sprockets last longer; the industry as a whole benefits; the SMPTE has carried through another routine item of its customary work.

Everyone in the industry is welcome to join in one capacity or another and help as far as he wants to or can. The work is never done and never will be. As long as there are a motion picture industry and a television industry there will be need for an SMPTE.

INTERNATIONAL PROJECTIONIST

VOLUME XXVII APRIL 1952 NUMBER 4

Progress Report: No. 1

What's New in Projection Screens

SCREENS are better, more versatile. They have features now that prolong their life—keep them from soiling as easily as in the past. They also may be used in a new way, as attentive readers will have noticed on page 16 of IP for January and page 18 of the February issue. Basic improvements over the screens of yesteryear lie in the materials used, in refinements of construction and in a wholly new psychological concept of the screen's position in the theatre.

For a white screen, the once-favored lithopone and white lead are definitely and permanently out as pigments. They aren't used any more. Lithopone wasn't white enough and white lead didn't stay white. As Leonard Satz of Raytone Screen Company puts it, there is no longer any choice of white pigments—the only thing for the manufacturer to use is titanox. This is the dioxide of titanium. It is whiter than lithopone, and it stays white. It is a very stable chemical, not easily subject to change, not exceptionally expensive and in plentiful supply.

Better Binders

The pigment, however, is only a white powder. It cannot be merely brushed over a surface and left there—it would dust off—it must be bound in place. Some years ago pigment and binder together amounted practically to a white paint. Then plastics came into use as binders, but some of these were readily flammable, some were brittle, some easily turned yellow, and some had all three faults.

In common use today are the vinyl plastics, particularly vinyl chloride. This is not flammable; it won't burn at all. It is not brittle but flexible, so that screens made with it need not be rolled for shipment but can be sent folded—an enormous saving in shipping charges that materially reduces the cost to the theatre and so makes it possible for theatres to replace their screens more often. Vinyl plastics also keep their water-white clearness very well; they have little or practically no tendency to turn yellow. Therefore they need replacing less often so far as internal chemical deterioration is concerned.

All-Plastic Screens

The screen originally was a woven fabric—cotton. A mixture of pigment and binder was painted or otherwise coated upon this fabric. There are still screens of that type on the market. But also coming into increasing use are strengthened plastics that do not need any fabric support at all. These consist of a sheet of plastic into which pigment has been incorporated. They are flame-resistant; there is nothing in or about them that burns. They are chemically stable and retain their whiteness and reflectivity over protracted periods of time. They are flexible and sufficiently crease-proof to be shipped folded and therefore at low cost.

Essentially crease-proof texture and "matte" embossing of modern vinylite screen are shown in this close-up view.

The all-plastic screens often have still another advantage in being more flexible than the fabric-backed type and therefore more resistant to vandalism. When small objects or even pop bottles are flipped or thrown at an all-plastic screen the general tendency of the screen is not to tear but to give way and snap back, almost as if it were a sheet of rubber. This feature contributes still further to their length of useful life.

At the same time a novel development by RCA, described below, actually tends to discourage the deposit of dust on the screen, again lengthening its useful life and reducing the need for replacement.

Refinements of Construction

One refinement (in which manufacturers differ somewhat in their practices) lies in the nature of the embossing given the surface of the screen in order to produce a "matte" surface and thus reduce gloss and sheen. It would not do to project onto a mirror surface. By embossing the surface in a definite pattern the degree and even the direction of the diffusion of reflected light can be substantially controlled. Thus RCA claims, for its Snowhite Screen, that "polygonal embossing in the surface

James Florio and James Dwyer (left), members of New York Stagehands Local 1, look on as Frank Cahill, Jr., director of projection and sound for Warner Bros. circuit, accepts an economically-shipped, folded RCA vinylite screen. At right is Bernard Sholtz, RCA sales representative.

breaks up the natural center aisle hot spot . . . and at the same time converts a large portion of the light usually lost in the stage wings and ceiling."

Further refinements are expected by many in the industry as a result of the very extensive screen brightness survey which has been and still is conducted by the Society of Motion Picture and Television Engineers. Progress has also been contributed in the last few years by investigators working on the problems of large-screen television for theatres. Since they were limited in the amount of light their equipment could produce they tried to compensate for this handicap by developing embossed screens that would direct all the light at the audience and waste as little as possible on side walls and ceiling. More efficient screen reflection was thus achieved; and the principles evolved can be applied to motion picture projection also.

Air-Tight Screen

RCA announced two months ago an "air-tight" screen which consists of any of a number of that company's Snowhite models plus a newly added thin, unperforated backing of black vinyl plastic. This backing peels off readily. In the course of installation, it is peeled away to expose the perforated rear surface over an area sufficiently large to permit normal transmission of sound from the loudspeakers. A kit shipped with the screen includes extra black vinyl material and a roll of black adhesive tape. By means of this kit used according to installation instructions, the rims of the loudspeaker low frequency and high frequency baffles are sealed to the screen. The screen's rear surface is thus completely sealed against backstage air currents.

This is the novel development, referred to above, that protects the screen against dust to a very considerable extent, since a large proportion of the dust that settles on any screen (and the most difficult portion to remove) is that which lodges in, and catches on the edges of, the perforations. This deposit comes from the air currents passing through the perforations. In the air-tight screen no currents of air traverse the perforations—they are sealed. The only air that can still drop dust on the screen is that which passes laterally or vertically along its front surface. The result is a decided decrease in dusting, less need for cleaning, and less frequent need for replacement.

Light-Surround Screen

As noted above, pros and cons of the light-surround screen were abundantly debated in IP for January and March. 1952, and so need be touched upon only briefly here. Theatre architect Ben Schlanger has contended for many years (often at meetings of the SMPTE, where heated debate sometimes followed) that the conventional black masking is psychologically wrong; that it creates the effect of "looking out of a tunnel into a lighted region" and produces eye-strain. Actually, the traditional masking performed three functions. It put the picture into a frame. It hid the projected edges of the aperture. It concealed small picture jump and other irregularities in the projection.

The new, much-discussed "light-surround" screen is RCA's commercial version of the theoretical development of architect Schlanger and his associate, William Hoffberg. It has now been installed in a number of houses. The installation illustrated here is in the Plaza Theatre, New York. The function of framing the picture is fulfilled by the flaring top, sides and floor of the three-dimensional assemblage. The frame, however, is neither black nor of any constant color or illumination. The inner surfaces of the flared frame are lined with titanox-and-vinylite screen material identical with the screen's own surface, and this material is fluctuatingly illuminated by reflection from the screen. The function of concealing the aperture edge and minor projected unsteadiness is performed by portions of the flares nearest the screen. The outer periphery of the projected picture falls on those portions of the flares and is reflected, but not toward the audience; therefore remains essentially hidden.

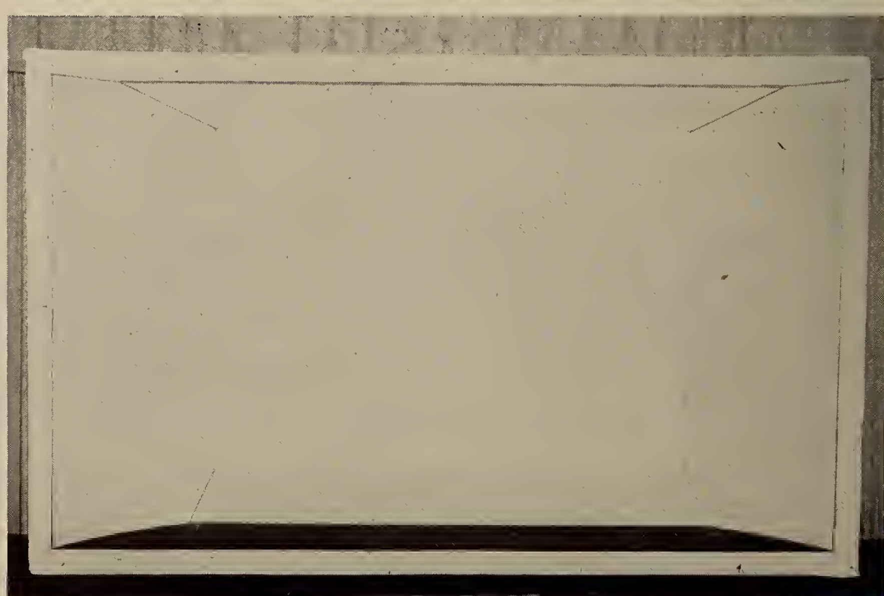
Special Screens

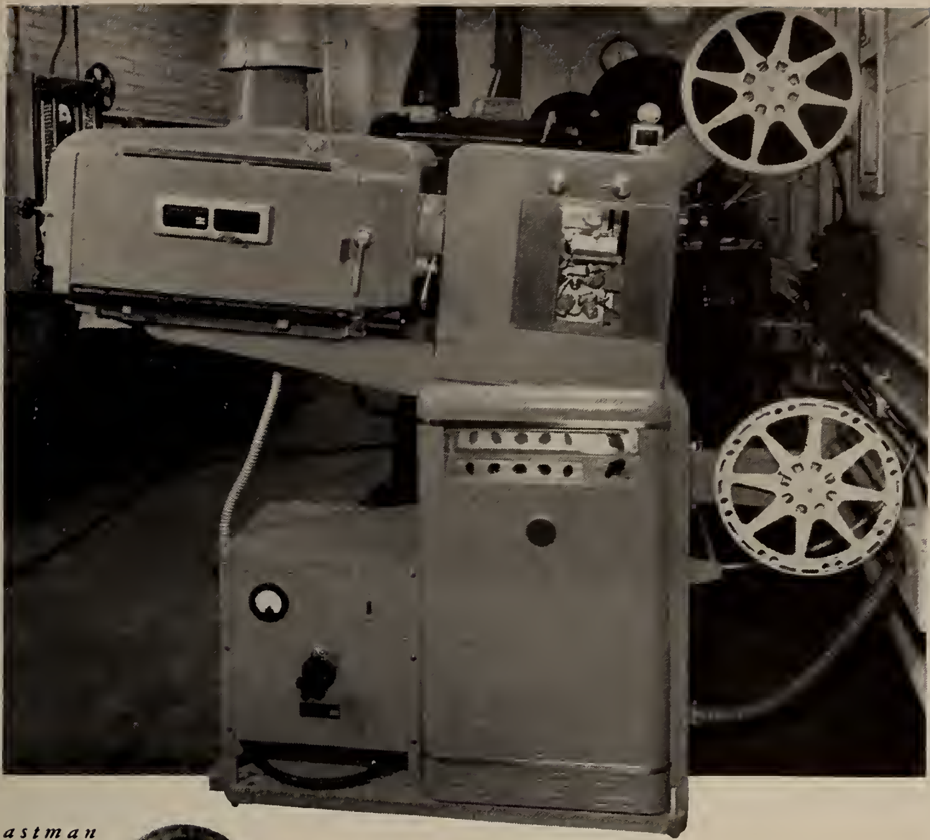
Although the titanium-vinyl screen, with or without fabric baking, is today the most popular type, it is by no means the only kind available. Beaded glass screens can be obtained for narrow auditoriums that can use them satisfactorily; "silver" sheets with embossed aluminized surfaces are on the market. And the titanium-vinyl white itself is offered in several "weights" or qualities and with other special variations.

Meanwhile, however, the drive-in theatre has brought projection technique all the way 'round a full cycle back to

(*Continued on page* 25)

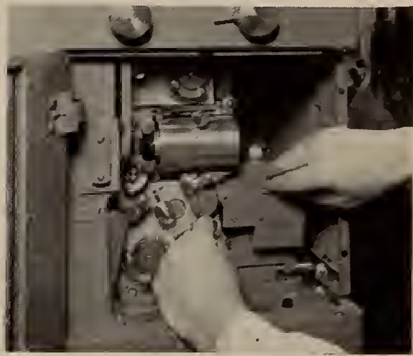
New "light-surround" screen framed in ever-changing illumination by its flared surround, which intercepts light scattered from the screen surface proper. Projected aperture edge falls on flares, not on screen, does not undergo reflection toward the audience, and therefore is essentially "masked" so far as persons seated in the auditorium area are concerned.



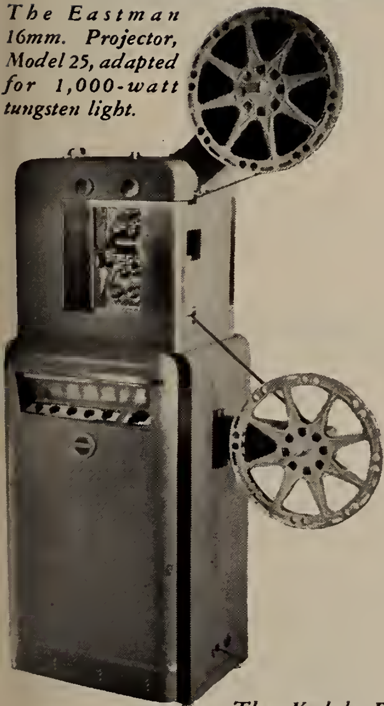


Left, the Eastman 16mm. Projector, Model 25, brings 16mm. projection to the professional level. Shown here, adapted for arc illumination, permanently installed alongside 35mm. equipment.

Below, working parts of the film movement mechanism are in constant view of the operator . . . readily accessible for threading and cleaning.



The Eastman 16mm. Projector, Model 25, adapted for 1,000-watt tungsten light.



The Kodak Projection Ektar Lens, in a choice of four focal lengths, insures superior screen image.

For Professional Quality Sound Projection from 16mm. Film

The Eastman 16mm. Projector, Model 25

This projection instrument—built to a new design concept—eliminates the three major obstacles to theatrical quality 16mm. sound projection . . . excessive wear and high maintenance cost; low signal-to-noise ratio; and excessive flutter.

A major cause of excessive wear and poor quality sound is the constant transfer of shock forces generated in the film pulldown mechanism to other parts of the system. In the Eastman 16mm. Projector, Model 25, the intermittent (film advance mechanism) is completely isolated and independently driven by its own 1440 r.p.m. synchronous motor. Thus, shock forces are sealed off from the rest of the instrument. The sprocket-shutter system is driven by its own 1800 r.p.m. synchronous motor. Exact phasing between the two systems is accomplished by specially designed synchromesh gears. In addition, the take-up spindle, rewind spindle, and blower are driven by separate motors.

New Sound Optics

A highly corrected microscope objective, adjustable for optimum sound quality from any type of 16mm. sound film, permits reproduction of variable area or variable density 16mm. sound tracks at extremely low distortion and a maximum signal-to-noise ratio.

To get the best out of any 16mm. sound film, project it on an Eastman 16mm. Projector, Model 25. For information on installation, availability, and prices, write directly to . . .

EASTMAN KODAK COMPANY, ROCHESTER 4, N. Y.

Three-Dimensional Projection in Europe

The extent of European interest and progress in three-dimensional projection is typified by the highly popular stereofilms shown at the recent Festival of Britain, as well as by the work of such investigators as F. A. Weber of The Hague, Holland. Excerpts from current correspondence with Mr. Weber and from one of his recent technical reports; and comment by Gerald Pratley of *Films in Review* upon the three-dimensional showings during the Festival of Britain, are cited herewith as examples of technical developments overseas.

"WITH great interest I read the articles about stereofilm in your excellent paper," Mr. Weber writes to IP, "and in return I thought it might be of interest to mention some conclusions arrived at amongst stereo experts in Continental Europe.

"I am in full agreement with Mr. J. A. Norling where he writes: (IP for February, 1952, Page 10) 'Complete visual comfort can be obtained in stereo movies only if the two images are projected simultaneously, if they are rock-steady, if they are of equal brightness, if they are of equal contrast, if they are properly aligned vertically and horizontally, if far distant points are not separated too far in one image from that of the other, and if they are of exactly the same size.'

Stereofilm

"Left and right images of 16-mm film size are suitable only for audiences of up to 100 or so (scientific, industrial, instructional or military audiences) on account of the approximately 60% loss of light which is inherent in all stereo projection systems whether with or without spectacles. . . . This leaves, in combination with single-film projection, only one possibility: alternate positioning of left and right 35-mm images on one 35-film. In case of moving subjects the left and right images must be photographed simultaneously to avoid 'time parallax.'

"Stereo preferably demands a projected image which is wider than that standardized for 'flat' motion pictures. The dimensions of the projected stereo image should be adapted as much as possible to the seeing area of the human eye. Therefore instead of the usual 3 to 4 or 1 to 1.33 of flat pictures it is preferable to use for stereo 1 to 1.65. This can be done by diminishing the height of the 35-mm image somewhat (from 16 to 13.5-mm). . . . This socalled WIDE-VIEW system has already been generally approved by the leading stereo experts of Germany.

"Stereo motion picture films should preferably be in color.

Stereophotography

"Stereo photography demands the use of wide-angle lenses, preferably fixed focus. . . . The stereo base (interocular distance of the camera), and the stereo angle (angle between converging optical axes running from stereocamera to object) should both be kept to that minimum which is just sufficient to produce on projection a true-to-life impression of depth throughout the whole audience. At the moment there are 7 or 8 appropriate formulas: American, Norling and Bernier; English, Dewhurst and Dudley; Dutch, Reijnders; German, Luscher; Russian, Iwanov and Andriewski. Generally, these formulas take into consideration one or more of the following factors: (a) distance from camera to object; (b) focal length of the lens(es) used; (c) range of sharp definition (depth of field) of lens(es); (d) depth of object; (e) projector magnification.

"But for several years it has been felt here in Holland that observation of projected stereo images depends strongly on psychological and physiological factors and that the mathematical formulas need corresponding correction. Attention may be directed to the doctor's thesis of F. H. Reijnders (Utrecht University, November, 1951). Dr. Reijnders, who is both a stereo research worker and a medical doctor, devoted many years to investigating stereophoto projection and the natural laws to be followed in obtaining true-to-life projection throughout the whole of the theatre, taking into account the 40 or 50 percent of spectators who have faulty vision. As a result of this work Dr. Reijnders recommends a physiological stereophoto formula in which the stereoangle is kept constant at 0.6 degrees for any distance and any depth of object (when using medium lenses with a focal length of about 1.6 the diagonal of the negative image). Films photographed according to this formula, Dr. Reijnders finds, give a true to life projected stereo image throughout the theatre and in addition *are observable with a minimum of eyestrain.*

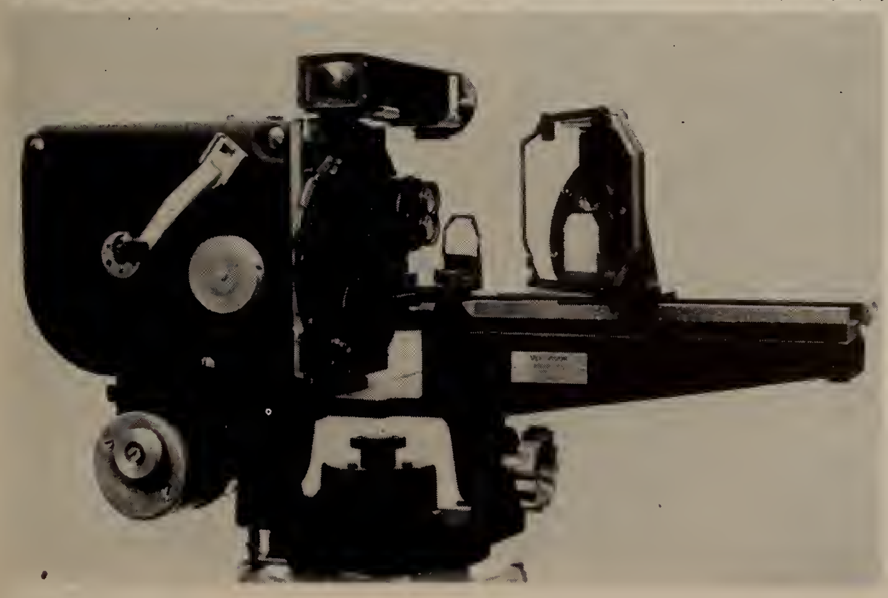
"I have constructed several cameras according to this minibase, miniangle formula. The resulting films, in my opinion and in the opinion of other experienced workers in this field, proved the correctness of Dr. Reijnders formula, strange as it may seem from the stereo-mathematical point of view. Depth is everywhere, wherever one sits in the audience, yet there is no effect of exaggerated depth when one walks away from the screen.

"Enclosed is a photograph of my new Universal 35-mm Stereofilm camera which can function according to any existing or future formula, its stereobase being variable between ¼ inch and 8 inches, and its stereoangle between 0 and 3 degrees.

"Finally, there is the matter of whether the image should be so photographed that when projected it appears to protrude into the audience. This is a mat-

(*Continued on page* 28)

Weber Universal Stereocamera for 35-mm film with variable stereobase and stereoangle that can be adjusted at will to meet the requirements of every known formula for stereophotography.



Better Film Care Improves Entertainment

PART TWO

To refresh the memories of all concerned, Eastman Kodak Company has prepared a very useful and authoritative set of reminders on film care. IP is glad to reproduce here a condensed version of Eastman's remarks concerning care of film in the theatre, and will in a future issue present a similar condensation of the same company's advice to exchanges.

A CONSIDERABLE portion of the film mutilation which admittedly occurs in the projection room is due to the various types and sizes of cue marks at the ends of rolls. In many cases, these are so carelessly done that large portions of the picture area are affected. Two, three or more sets of marks are not uncommon and they consist of punch marks, lacquer bands, large cross lines and scratches of every description. Examples taken from theater prints are shown in Figure 6. These are but a few of the marks commonly encountered *and many which have been found are considerably worse.*

Loss of footage may be caused by the end of the film whipping around on the rewind or projector take-up before the roll can be stopped. This then makes it necessary to place new cue marks on the film, but it is not necessary to have an elaborate assortment of marks. Many projectionists cover at least some of the unwanted marks with narrow strips of adhesive tape, but these strips have been known to peel off and lodge in the magazine valve rollers.

Sprocket Tooth "Roping"

Sprocket tooth dents, often identified as "roping" or "runoffs" by exchange inspectors, are also a consistent cause of film mutilation. These marks, shown in Figure 7, are commonly seen between the perforations and are also often found through the track and picture areas in a weaving pattern. A "runoff" may start at a poor splice if the film jumps the sprocket, but it can also result from improper threading. Often the film becomes so weakened that subsequent edge bending causes the edge to break. The space between the rollers and the sprockets should be checked, and it is important to see that both rows of perforations are properly engaged with the sprocket teeth before clamping down the rollers.

FIG. 7. A poor splice or improper threading caused "roping" of this print.

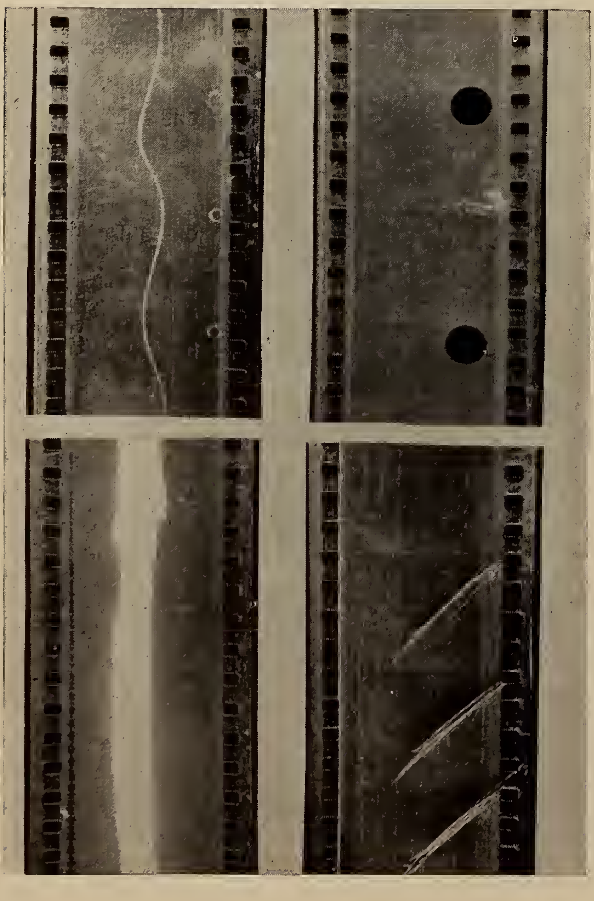


FIGURE 6

A few examples of film deliberately mutilated by improper cue marks.

Pleating

Projectionists will recognize the type of damage shown in Figure 8 as that resulting from folding of the film in the sound head due to a break at this point. It is often erroneously referred to as "buckle" by the exchange people.

Edge Bending or Creasing

Projectionists are also familiar with film bending through the perforations, or more often between the perforations and one edge. This type of damage, which is usually referred to as "idler cramping," can be especially harmful in the case of film which is somewhat brittle and when the bending is against the emulsion side, since long edge sections may be broken off completely. This particular type of mutilation has been known to occur repeatedly at the first pad roller following the intermittent loop. The trouble usually starts at an edge break or at a loosened corner of a splice. It might also result from careless threading. If no attention is given to this trouble, this bending may continue as far as the stiffened area of the following splice before the film properly reseats itself.

FIG. 8. Pleating caused by a break in the soundhead and resultant folding of the film.

Misunderstanding still exists concerning the general performance of safety film. Many projectionists are under the impression that the present high acetyl type safety film is the same material which they may have encountered in the years past. This is not so. Present day safety stock now replacing all nitrate film has properties which are fully suited to the requirements of commercial use. The projected screen image obtained from the new safety film is equivalent to that obtained from the former nitrate base materials. In many respects, the new safety material is superior to the nitrate film formerly supplied. Splicing should not be any more difficult with the new film than with nitrate base materials if the proper procedures are followed. A splicing unit of some kind, however, is definitely recommended. *Hand splicing will not give dependable results today.*

Increased Screen Brightness

In recent years much interest has been shown in the problem of obtaining higher screen illumination, particularly for use in drive-in theaters and for indoor theaters having very large screens. Increased illumination has been made possible by developments in high speed optical systems and new types of carbon arcs. With the increase in the screen illumination, there has been a corresponding increase in the temperature of the film at the aperture. The film characteristics place a limit on the maximum light available for screen illumination, since as it is heated to higher temperatures a point is reached beyond which satisfactory projection becomes difficult. Still further increase in temperature may ruin the film beyond hope of repair.

One of the first effects noted in the film as projection intensity is increased is an embossing of the frames and of the image within each frame. When examined by reflected light, at an angle nearly coincident with the plane of the film, each frame can be seen to stand out like a small cushion and frequently the image itself appears as though it were carved into a small plaque. Most film, after having been projected, shows some embossing and the extent of this embossing increases with the light source intensity. This embossing, however, even when severe, docs not impair the screen image quality, although when embossed film is spliced to unembossed film it may be necessary to refocus slightly at the splice.

As the light source intensity is increased still further, the film may, in many cases, show a discoloration of the image. This discoloration is not noticeable when the picture is projected upon the screen but when the film itself is examined against a piece of white paper, the frame areas show a distinct sepia tint. No real danger to the print exists, however, as a consequence of this effect, since it is still capable of giving a top quality screen image.

However, if the intensity is increased still further, an in-and-out-of-focus ef-

(*Continued on page* 23)

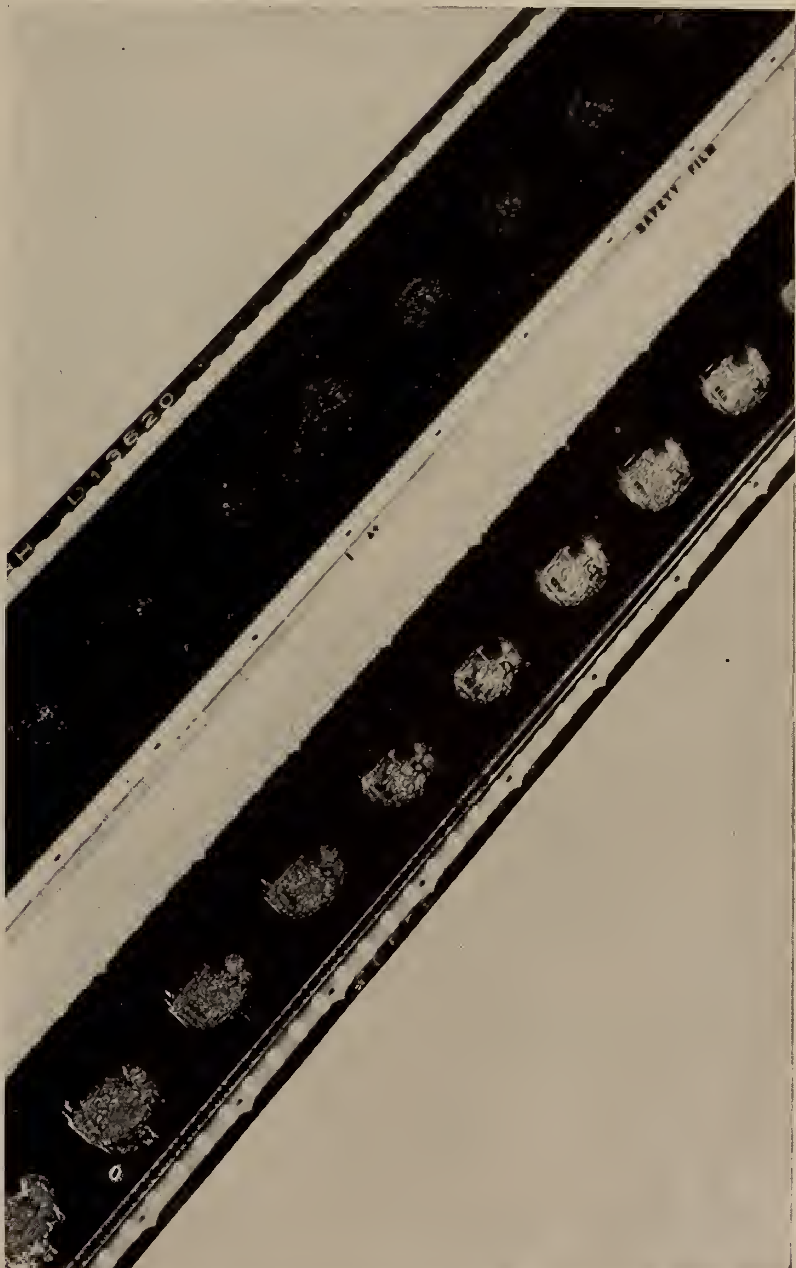


FIG. 9. These prints were ruined by blistering caused by excessive aperture temperature.

Home TV vs. Theater Attendance

By DR. ALFRED N. GOLDSMITH

No man in the United States can speak on this subject with greater authority and impartiality than Dr. Goldsmith. Pioneer consulting engineer in the fields of both radio and television, past president of the Society of Motion Picture Engineers, "elder statesman" of our industry, Dr. Goldsmith is always in closest touch with the facts and the trends, and invariably objective in his public comments. These that follow were prepared by him especially for IP.

TELEVISION has affected motion-picture attendance. When all the radio set owners in a given city have bought television receivers, the theater audiences mav drop 30%, or more. However, the well-run theater, operated on an economical basis, and showing a selection of good films, can still stay in the picture. Second-rate theaters, with excessive admission prices and an assortment of "B" pictures, will have trouble. They, as well as the Hollywood producers who cannot furnish high-quality pictures, will be much injured.

Television broadcasting is now running at a profit. Most of the stations are doing quite well. The networks, while not doing as well as the stations, are beginning to get into the black. At least one network is better than breaking even. It usually costs $200,000 or more to establish a station and about $100,000 a year to operate it. New stations lose money for a year or two, as a general rule. Then they break even. After three or four years they make a good annual profit.

The Federal Communications Commission expects that there will be about five hundred stations on the present channels and about two thousand more stations, mostly in smaller cities and towns, on the so-called uhf channels which are soon to be opened up. If this large number of stations is established, the competition may be very severe and profits may be cut down.

On the whole, television seems in a healthy condition and, for the present at least, has strong public interest.

Despite the FCC "freeze" on the licensing of new television stations (which freeze will shortly be lifted), the number of stations in the United States is now 108 and the known number of receivers in the home about 16,200,000. The average audience per receiver during evening hours is about 3.2. The potential evening audience is therefore over 50,000,000—not all of whom, of course, actually view television every evening. Nevertheless, the audience is a large and enthusiastic one. Television aerials dot the roofs of rich and poor alike. And perhaps another four or five million receivers will be installed during 1952.

Television programs, despite occasional commercial announcements which are either too long or too irritating, are well received by the audience. The favorite programs are of the vaudeville type. Dramas and comedy, sports events and give-away shows, and news and debates are popular with the television audience. On the whole, the programs are well received even though it is indeed difficult to produce hundreds of hours of television entertainment each week and to keep the quality at a good level.

TV Freeze Ended

As here predicted by Dr. Goldsmith a month before the fact, the FCC lifted the freeze on new TV broadcast station construction, on Easter Sunday, April 13th. The way was thus cleared for adding 2,053 new telecast stations to the 108 stations at present operating in the United States. "Very high frequency" (54 to 216 megacycles) and "ultra high frequency" (470 to 890 megacycles) figure in the newly-announced thaw.

No specific action was taken by the FCC relative to theater television as distinct from other broadcasting. Industry sources expect that such action may be taken later this year; and that theater TV allocations will be assigned to the UHF band.

Concurrently with FCC announcement, Associated Press revealed that it will supply news-on-film to television broadcasters.

SMPTE Convention Stresses Stereo, TV

TELEVISION and stereoprojection feature the program of the SMPTE's 71st Semi-Annual Convention, scheduled for April 21st to 25th at the Drake Hotel in Chicago. On the first day, April 21st, there will be presented no less than seven papers on TV.

The Society of Motion Picture and Television Engineers stages these conventions twice each year in addition to the many meetings of its local sections held at more frequent intervals in all parts of the country.

The Society's program for the nationwide Chicago gathering, as disclosed by President Peter Mole, schedules the get-together luncheon for Monday (the 21st) noon and the cocktail hour and banquet for Wednesday evening (the 23rd).

Monday afternoon Robert E. Lewis of Armour Research Foundation; Sam H. Kaplan, consultant; A. D. Fowler and H. N. Christopher of Bell Telephone Laboratories; and Fred Barton and H. J. Schlafly of TelePrompter Corp., will present papers on television. J. A. Norling, Chairman of the Stereoscopic Motion Pictures Committee, will submit his commitee's semi-annual report.

Monday evening additional papers on television will be read by M. C. Banca of RCA; by Frank Rissle of Motiograph, Inc.; Victor Trad of Trad TV Corp.; and by John M. Sims of General Precision Laboratory. W. H. Offenhauser, Jr., will present a suggested system of nomenclature for motion pictures and television.

Tuesday morning the convention will hear a report on international standardization by D. R. White; and the report of the Progress Committee by its chairman, Charles W. Handley. Charles Underhill, Jr., of RCA, and Benjamin Schlanger and William Hoffberg, theatre consultants, will describe "The Synchro-Screen as a Stage Setting for Motion Picture Presentation." A new direct-vision stereo-projection screen on which audiences can see the picture in three dimensions without wearing viewing glasses will be unveiled by W. W. Jennings and Pierre Vanet. Tests indicate that with this 3-dimensional screen eye-fatigue is less than with others previously tried, the convention will be told. Ellis D'Arcy and Gerhart Lessman of DeVry Corp. will present a method for measuring screen brightness in rear projection. H. B. Brueggemann of Cinecolor Corp. will reveal a device for measuring aperture illumination brightness continuously while the picture is being projected.

Tuesday afternoon will be devoted largely to military aspects of motion picture projection. On Tuesday evening both Bell and Howell and De Vry will introduce new 16-mm magnetic-optical sound projectors. The Harwald Company shows a film-inspecting machine.

Wednesday will be devoted chiefly to

(*Continued on page 26*)

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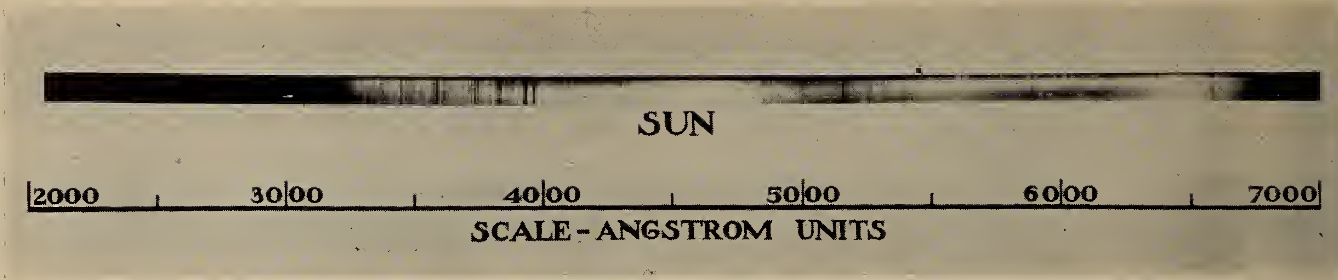


RADIATION SPECTRUM OF SUNLIGHT AS MEASURED IN ANGSTROM UNITS ONLY

Light and the Angstrom Unit

DISCUSSIONS of motion pictures, radio, television, radar, X-rays, and literally hundreds of other electronic devices bring repeated reference to wave frequency and wavelength and their measurement. It is necessary to define the characteristics of light radiation from a given source in exact terms, and the usual unit of measurement is the Angstrom Unit.

Knowledge of the generally accepted theory of light radiation is essential in order to understand the meaning of such a unit. As is well-known, all forms of radiant energy are compared to the ripples produced when a stone is dropped into a pool of still water, causing concentric waves to radiate in all directions. Light waves, radio waves, infrared waves, ultraviolet waves and X-rays, all traveling at 186,000 miles per second, are of the same family (electro-magnetic) and are physically identical in nature as respects their speed of travel and their composition; they differ only in their frequency of vibration or wavelength. By frequency is meant the number of complete waves or cycles passing a given point in one second, and by wavelength is meant the distance between successive wave crests.

Color and Frequency

A violet ray at the limit of visibility has a frequency of 750 million million vibrations per second; a certain green ray has a frequency of 600 million million; while one of the red rays has a vibration frequency of 400 million million per second. These frequencies are so high that even at the tremendous speed they travel the longest wave length (or distance between wave crests) of visible radiation is but 0.00003 inch long, and the shortest about half that length.

Light also is known to be far more complex than it appears to the human eye. The eye cannot separate a beam of light into different colors. Daylight, for example, consists of an essentially even balance of all spectral colors. Color is the perception of wavelength differentials within the visible spectrum. However, the eye does not respond to all colors. The infrared or heat waves have too long a wavelength to be perceptible to the eye, and the ultra-violet rays have a wavelength that is too short to be seen. The colors between these extremes are referred to as the luminous (visible) rays and these may be further identified by the color sensation they produce on the eye.

Measuring Stick for Wavelengths

Using minute fractions of the familiar units of measurement, such as millimeters, inches, feet and so on, would involve astronomical figures that obviously would be neither convenient nor practical. To use our shortest familiar unit of length, the millimeter, in defining wave lengths would be equivalent to giving the size of this page in miles rather than inches. In order to establish a more convenient unit for measuring the wave length of light, the Swedish physicist, Dr. A. J. Angstrom suggested a unit that is 1/100,000,000 centimeter in length. This is called the Angstrom Unit, in honor of its originator, and usually is abbreviated to A.U. Colors in the luminous range of the spectrum may be defined by this scale as follows:

Violet	4000 to 4500 A.U.
Blue	4500 to 4900 A.U.
Green	4900 to 5700 A.U.
Yellow	5700 to 5900 A.U.
Orange	5900 to 6300 A.U.
Red	6300 to 7000 A.U.

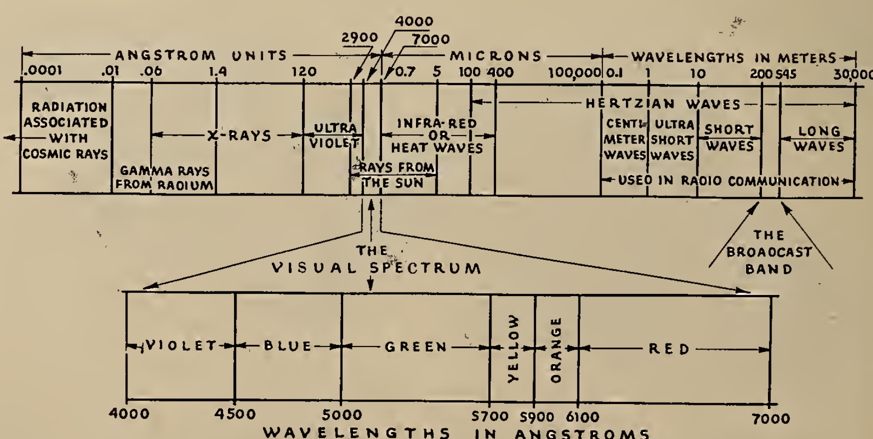
Thus it is evident that the visible range of the spectrum is from 4000 to 7000 A.U. The shortest rays reaching the eye in natural sunlight are about 2900 A.U., which are too short to be seen.

Another unit, which is ten times the length of the Angstrom Unit, also is widely used. This is called the *millimicron.* Microns and millimicrons are perhaps more convenient yardsticks for the longer wavelengths such as heat; and meters and centimeters for the still longer wavelengths of radio. For light measurements, the Angstrom Unit is commonly preferred.

The accompanying table sets forth the (*Continued on page* 26)

LIGHT MEASUREMENT UNITS CONVERSION TABLE

1 millimeter	=	0.1 centimeter	=	0.03937 in.	=	1000 micron
1 micron	=	.0001 cm.	=	.00003937 in.	=	1000 millimicron
1 millimicron	=	.0000001 cm.	=	.00000003937 in.	=	10 A.U.
1 A.U.	=	.00000001 cm.	=	.000000003937 in.		



ELECTRO-MAGNETIC SPECTRUM AS MEASURED IN ANGSTROMS, MICRONS AND WAVELENGTHS

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IN THE
SPOTLIGHT

WE are glad to report that the Erwin-Travia bills, aimed to prohibit political contributions by union members, were defeated by the New York Assembly on the last day of the 1952 session. The bills, which were bitterly opposed by A F of L and CIO unions in the state, called for provisions that banned direct contributions from the general funds of a union, and prevented any union officer or agent from soliciting for voluntary contributions from union members to a political campaign. The bills were obviously aimed at Labor's League for Political Education, and were an attempt to stifle political activities by the unions.

• San Antonio Local 407 lost one of its old-line members in the recent death of Charles R. Breuning. He had been in failing health for some time and had been off his job since July of last year. Breuning was one of the Local's most highly respected members and his death left a void in the hearts of his many friends in the Alliance.

• Action was taken recently by IA Hollywood Local Unions to protect their members from fly-by-night motion picture producers who operate on the proverbial "shoestring" and very often find themselves unable to meet their payrolls. In the future, these independent producers will be required to post a bond for salaries for a two-week period, or, in cases where production will take less than two weeks, the bond will have to cover the number of actual working days. It is hoped that this action will eliminate the growing tendency to produce pictures without proper financial backing, very often resulting in a considerable amount of money being lost to the workers.

• The officers and members of Buffalo Local 233 recently held a grand jubilee at the union headquarters, 498 Pearl Street, in celebration of the burning of the mortgage on the building.

• According to an article appearing in a recent issue of the *New York Times*, a survey among first-run theatres in Los Angeles shows a 7% increase in gross business for the first quarter of 1952. This bears out our contention that despite Tv or advanced admission prices, the public will turn out for motion pictures when it is given the kind of entertainment it wants.

• Local 586 (Columbus, Hastings, Norfolk, Grand Island, and York), Nebr., celebrated its 25th anniversary at a party held at the Hotel Yancey, Grand Island, on April 16. Top IA officials were present at the banquet and the membership turned out en masse for the occasion.

• James V. Sipe, secretary of Local 171, Pittsburgh, Penna., represented his Local at the recent A F of L Convention in Wilkes-Barre.

• We recently learned of the death of Bert F. Neal, 39, member of Local 720, Las Vegas, Nev., following a major operation. Neal served Local 720 in various official capacities. He was business representative for the Local from 1947 to 1949; a member of the Clark Country Central Labor Council in 1949; and served as a delegate to the Cleveland, 1948, and Detroit, 1950 IA Conventions. Funeral services were held in Karnes City, Texas, where his parents, Thomas and Ida Neal, reside.

• California District Council No. 2 held its first 1952 meeting several weeks ago at the Carolina Pines Cafe in Hollywood. Theatre Tv and wage negotiations with the major circuits were among the important topics discussed at the meeting. The next Council meeting is scheduled to be held next May in Santa Barbara.

• In our opinion, the following excerpt from a recent address by Elmer Davis, the noted news analyst, is worth reprinting here:

> The most important thing in the world is the freedom of the mind, from which all other freedoms spring. It is a dangerous freedom, but this is a dangerous world; you can't think right without running the risk of thinking wrong. But for any momentary evils that may come from thinking, the cure is more thinking; errors will correct themselves. Without the freedom of the mind, the human race will never get anywhere.

• William H. Hartnett, business representative for Local 257, Ottawa, Ont., was publicized several weeks ago in one of Ottawa's dailies, *The Evening Citizen*, and was described as a "pillar of the theatrical world in Ottawa." And rightly so, we believe, for William Hartnett has been active in theatrical circles for the past 44 years, having started his career in show business in 1908, when at the age of 13 he distributed handbills for one of the local theatres. From there he went on to ushering at the first Keith Theatre in Ottawa, later working as a relief projectionist, and still later serving in World War I.

Upon his discharge from the Canadian Army in 1915, Hartnett joined the newly formed IA Local 257. He served the Local in various official capacities since 1916, holding the office of president from 1919 to 1925, and was elected to his present office as business representative in 1927. He has met a number of stage and screen celebrities who played Ottawa, and when caught in a reminiscent mood he can rattle off many an interesting yarn about them. Bill Hartnett has represented his Local at IA and District Conventions for many years, and has gained the respect and admiration of his many friends in and out of the Alliance.

• Morris J. Rotker, member of New York Local 306 and past president of the 25-30 Club, was unanimously re-elected chairman of the local school board, District No. 18, Bronx, N. Y. He was recently presented with an honor award certificate by the New York City Board of Education for his "outstanding contributions towards the welfare of the youngsters of the City of New York, and for his suggestions for the Board policy which have shown creativeness, originality, and initiative."

Morris J. Rotker, member of New York L. 306

From reports reaching this corner, Rotker richly deserves these honors, for he devotes much of his time away from his job as projectionist at the RKO Marble Hill Theatre in New York to the needs and problems of his less fortunate fellowmen.

• A dispute in wages between Local 631, Orlando, Fla., and Gordon-Niblack, Inc., new owners of the Carver and Lincoln Theatres, ended in a deadlock and at

(*Continued on following page*)

Green Light for Pension Plans

UNIONS are now free to negotiate and establish paid retirement programs for their members, or to improve existing plans, without incurring a penalty in so doing, notes *American Federationist*, the official publication of the A F of L, in its March, 1952 issue. Employer contributions toward the cost will no longer be charged against any wage increases which might otherwise be permissible under wage stabilization regulations.

After more than a year of deliberation, argument and delay, *Federationist* points out caustically, the Wage Stabilization Board has finally decided that elderly pensioners are not responsible for inflation. In a new policy ruling adopted on February 22 and issued as General Wage Regulation No. 21, the Board agreed to remove employer-financed pension plans from the cold storage vault.

The regulation places no fixed limits upon the amount of benefits which may be provided upon retirement or in case of permanent and total disability before retirement, nor upon the amounts which employers may contribute to a pension fund. Unions and employers are free to adopt any type of benefit formula, or method of determining the amount of pension to be paid to retiring members, that they desire.

Requirements

The only specific restrictions to which they must conform in order to obtain "automatic" approval for their plans are as follows:

(1) The normal retirement age for full benefits must be at least age 65. Benefits paid to employes who retire before age 65 must be reduced to the extent necessary to take account of the shorter period of service before retirement. Except in the case of early retirement for disability, they must also be reduced to take account of the longer period of life expectancy during which the pension will be paid and other "actuarial" factors.

(2) Payment of benefits, except death benefits, must be spread over the lifetime of the employe. They cannot be paid in a cash lump sum.

(3) The plan cannot provide for the payment of cash benefits, derived from employer contributions, to employes who sever their employment before retirement. However, "deferred vesting" rights, whereby the employe receives a paid-up annuity or permanent equity in the pension fund which will pay off when he does reach age 65, may be provided.

Procedure

Before a plan can be put into effect, the union and employer must file a report of the details of the plan directly with the Wage Stabilization Board in Washington. The Board is now preparing a special form for this purpose. Copies of the form will be available at offices of the Wage and Hour Division of the Labor Department.

The Board will acknowledge receipt of this report, and unless the parties are notified to the contrary within 30 days after the date of the acknowledgment letter, they may put their plan into effect as of the effective date provided for in the terms of the plan.

Reports of pension plans which do not conform to the restrictions described, or which the Board feels may be "unstabilizing" on other grounds, will be treated as petitions for approval, and the unions and employers will be so notified. Such plans cannot be put into effect until the parties receive notice that the Board has approved them.

The regulation imposes the further requirement that a plan must eventually obtain Bureau of Internal Revenue approval for tax exemption before the Board will regard it as "finally" approved. However, the parties do not have to sit out an extended wait for Internal Revenue approval before putting their plan into effect, but may do so as soon as it clears the Wage Stabilization Board.

Profit-Sharing

Regulation No. 21 also covers "profit-sharing" plans of the deferred compensation type. Profit-sharing plans which provide retirement, total and permanent disability or severance benefits may be put into effect, *after* Bureau of International Revenue approval, if (1) benefit payments do not begin until at least ten years after an employe's admission to the plan and (2) such payments are payable over at least a ten-year period.

Approval is subject to the same reporting and waiting-period procedure as in the case of straight pension plans.

(Continued from preceding page)

this writing the theatres are being picketed by the union. The new owners refused to pay the projectionists the $1.97 per hour agreed to by the former management and approved by the War Stabilization Board.

• Albert Reith, member of Boston Local 182, is back on the job at the Keith Memorial after a month's sojourn on the sunny beaches of Miami.

• IA President Richard F. Walsh appointed John J. Francavilla, former president of the Laboratory Technicians Local 702 New York City, International representative of the IA's new radio-television department.

• Joe Perlman, veteran member of New York Local 306 and member of the 25-30 Club, sailed on the U. S. liner *Independence* recently for a visit to Israel where he will be reunited with his mother, whom he hasn't seen for about 40 years. Joe left Rumania, his birthplace, when a youngster and although he made many attempts in the intervening years to get his mother out of that country, his efforts were fruitless. Several months ago, however, the restrictions in that country were lifted for a short period and a limited number of its citizens were permitted to leave for other countries. Joe Perlman's mother was one of the fortunate few. That the reunion will be a joyous one is a foregone conclusion.

• We regret to report that Joseph Monaco, business representative for Local 366, Westchester County, N. Y., died suddenly on April 8. Monaco was an official of the Local for many years and his untimely death was a shock to his associates and fellow-members.

RCA 7-Inch Monitor Kinescope

RCA has produced a new 7-inch, direct-view kinescope designed for monitor service in conjucntion with theatre, industrial, and portable Tv equipment.

Heart of the industrial kinescope (RCA-7TP4) is a newly-designed electron gun of the electrostatic-focus type which has been engineered to provide high picture resolution and to maintain good uniformity of focus over the entire picture area. Focus can be maintained automatically with variation in line voltage and for changes in picture brightness.

The 7TP4 also features a metal-backed fluorescent screen which heightens picture brightness and contrast, and, equally important, eliminates the need for an ion-trap magnet. The new monitor tube measures 13⅛ inches in length and provides a picture 5⅜ by 4 inches.

Baughman for GPL on Coast

West Coast representative for all General Precision Laboratory television equipment is now E. J. Baughman, who has been well known in electrical sales and engineering in the Far West for over 30 years. His background includes a degree from Stanford and long experience in radio, electrical specialties and television. Baughman will handle sales of GPL's TV camera, recording, switching and projection apparatus from headquarters at 350 South Central Avenue, Los Angeles.

Arclamp Generators

By ROBERT A. MITCHELL

II. Generator and Arc Circuits*

THE dynamo is roughly analogous to a force-pump in action. The pump (generator) does not *create* water (electricity), but merely sets up a current of water (current of electricity) by creating pressure (voltage) which overcomes the resistance (ohms) opposing the flow of current (amperes) in the external circuit.

The two essential parts of a dynamo are the field magnet and the armature. The field magnets establish magnetic "lines of force" in space which are "cut" by the revolving armature. Provision is made by the commutator and brushes for collecting the current induced in the armature.

Because the induced current periodically reverses itself as the various coils pass under north and south magnetic poles, thus being an *alternating* current, the commutator also acts as an automatic reversing switch to convert this AC into *direct* current. If a pair of slip-rings be substituted for the segmented commutator, AC appears at the generator terminals; and the generator is then called an "alternator" instead of a "dynamo."

One of the most important mechanical features of the dynamo are its bearings. These are subject to wear, and hence must be lubricated and kept up in good condition by the projectionist. The care of bearings will be taken up in the concluding installment of this series.

As previously stated, the electrical performance-characteristics of dynamos are determined largely by the manner of wiring and connecting the field coils.

Types of Dynamos

A *series dynamo* is thus called because its field windings are connected directly in series with the commutator brushes and the external circuit. (See Fig. 2.) One lead from the field is connected to one of the brushes, the other lead to the external circuit, and the return from the external circuit to the remaining brush. All of the current passing through the armature and external circuit must also pass through the field windings. For this reason, the series field windings consist only of a few turns of very heavy wire.

Series dynamos are not used as theatre arc-lamp generators; however, one make of very powerful arc generator does incorporate a small series dynamo whose function is to excite the field magnets. This machine will be examined when we come to the class of "separately excited compound-wound dynamos."

Series dynamos furnish current at an increased voltage as the load increases—an undesirable characteristic for arc-lamp operation. Further, a series generator cannot "build up" voltage until the load has been applied. The reason for this is easy to understand. When the external circuit is open (as it is before an arc is struck), no current is able to pass through the field windings. With no field magnetism, there can be no current at the generator terminals.

Series field windings nevertheless play an important part in the compound-wound dynamos designed expressly for projection work.

The term "building up" applies to the production of current in the field coils of a self-excited generator, as most theatre generators are. Now, even electromagnets having soft-iron cores retain a small amount of magnetism, and accordingly act as very weak permanent magnets. This *residual magnetism* causes weak currents to be induced in the armature when the motor-generator set is switched on. Practically all of this induced current is fed back into the shunt field windings of shunt and compound dynamos, thus strengthening the magnetic field. The process of building up the field magnetism proceeds until maximum saturation is attained.

On rare occasions the projectionist may find himself embarrassed by failure of the generator to build up. There are various causes of this trouble, and also several effective remedies. A discussion of these is deferred to the concluding article.

In the *shunt dynamo* the field coils, which consist of many turns of fine wire, are connected in shunt, or parallel, with the brushes. The induced current accordingly has two circuits in which to flow: the field circuit and the external circuit. Usually the external circuit gets the lion's share of the current because the current divides between the two circuits in inverse ratio of ohmic resistance.

Figure 3 illustrates the general plan of the shunt dynamo. When both this diagram and Fig. 2 are thoroughly grasped, the compound and separately excited dynamos will offer no difficulties.

Shunt dynamos furnish a falling vol-

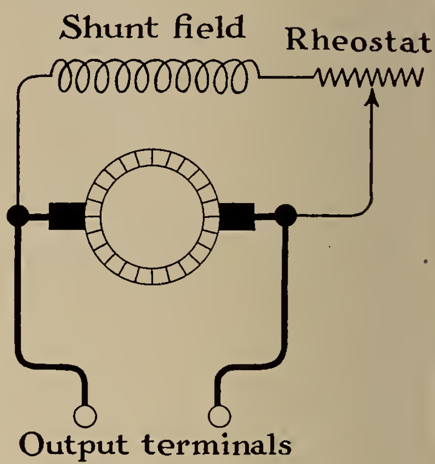


FIG. 3. Shunt dynamo. The rheostat connected in series with the shunt field controls the strength of the current flowing through the windings, and hence the strength of the field magnetism. Adjusting this rheostat varies the output voltage of the dynamo.

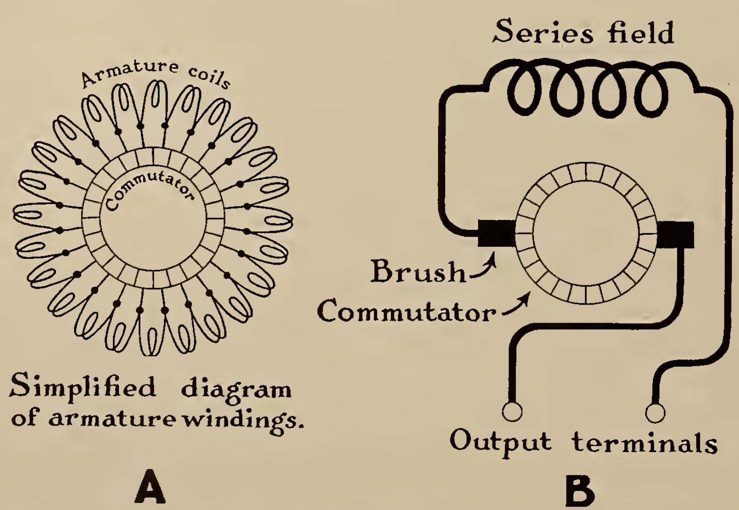


FIG. 2. Series dynamo. In *A* is shown the general plan of "lap" armature windings. Note that the ends of adjacent coils are brought out to the same commutator bar. Most arc-lamp generators have this type of armature.

* Second of a series of three articles on the development, application and maintenance of generators.

tage as load and current increase. This type of generator, while superior to the series dynamo for arc-lamp operation, is still not wholly satisfactory because a separate generator is needed for each arc lamp.

The *compound dynamo* overcomes the defects of series and shunt machines, yet preserves the good features of both. As its name indicates, the field magnets have two separate windings, one a series winding of a few turns of heavy wire, and the other a shunt winding of many turns of fine wire. The field rheostat regulates the current flowing through the shunt winding, and hence is connected in series with this winding, as shown in the diagrams. The amount of current flowing in the series winding is determined by the external load—the ballasts and arcs.

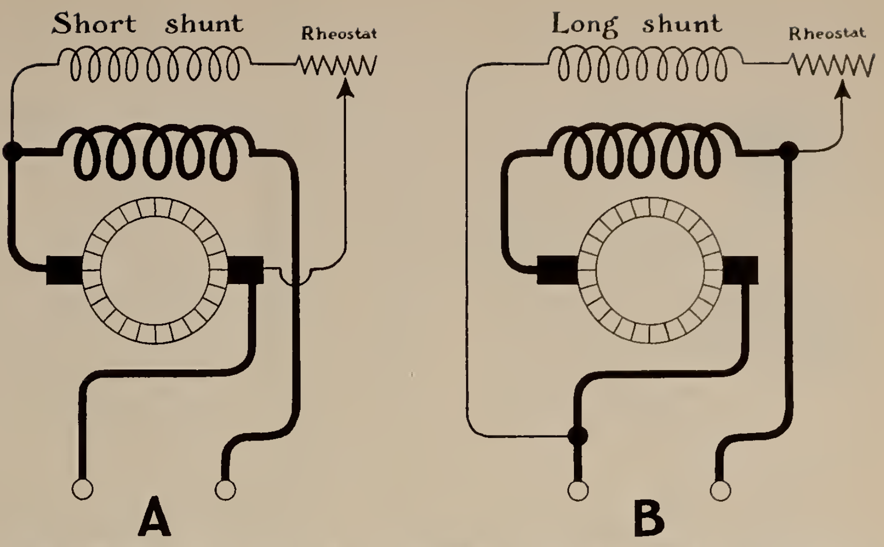


FIG. 4. Compound-wound dynamo. *A* is a diagram of a "short-shunt," and *B* of a "long-shunt" machine. In *A* the shunt field is connected across the brushes; in *B* across the output leads. Most arc-lamp generators are short-shunt compound dynamos.

Characteristics of Compound Dynamos

Fig. 4 shows two types of compound dynamo. The two are distinguished only by the connections of the shunt field. Most arc generators are of the "short-shunt" type (i. e. the shunt field is connected across the brushes).

The shunt and series fields of compound-wound arc-lamp generators are wound and connected so that their magnetic fields reinforce each other. By proper compounding the voltage at the generator terminals remains constant, or nearly so, regardless of the load.

In an "over-compounded" dynamo, which has a greater number of turns in the series winding than has a normally compounded dynamo, the voltage rises somewhat as the load is increased. An arc generator should be normally or only very slightly over-compounded — never under-compounded.

It should be remembered that a generator can be properly compounded only for loads lying within certain limits. For loads outside these limits perfect generator performance cannot reasonably be expected.

The *separately excited dynamo*, shown in Fig. 5, is similar to a compound-wound dynamo, except that its "shunt" field is excited by a small auxiliary dynamo. There is thus no electrical connection between the main generator and the separately excited coils. This method of obtaining field magnetism, utilized in the Motiograph Hi-Power 125—250 amp. generator set, makes for almost perfect automatic current regulation and stability of the arc. The exciting dynamo is a series machine, and its armature is on the same shaft as the armature of the main generator and the rotor of the driving motor. Note that the field rheostat is inserted in series in the exciting circuit.

Most arc generators and other small dynamos have 4 or 6 magnetic poles in the field (2 or 3 complete magnetic circuits). Each pole consists of a soft-iron core (usually laminated to prevent heating caused by "eddy currents" back-induced from the revolving armature) having both the series and shunt coils wound around it. In the ordinary compound-wound and separately excited dynamos, the shunt (or separately excited) field furnishes the greater part of the magnetism, while the series field functions primarily as a regulator, boosting voltage as load increases and reducing it with declining load.

The action of the series field is sometimes aided by the introduction of small poles called *interpoles* between the main poles. These in-between poles are series wound, and serve to provide better voltage regulation over a wide range of load. It is only necessary for the projectionist to keep in mind that the interpole winding is continuous with (in series with) the main series winding. Many arc-lamp generators, however, do not have interpoles.

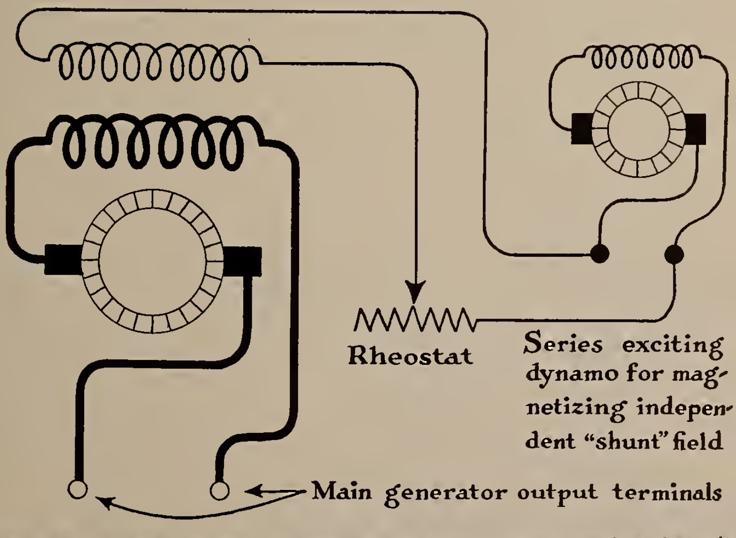
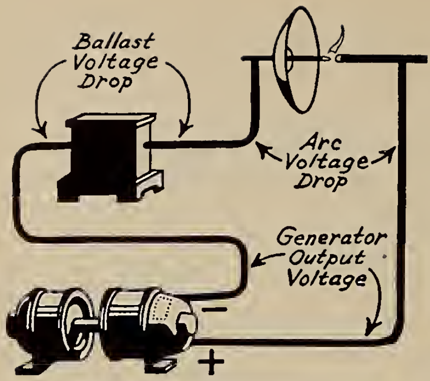


FIG. 5. Separately excited compound dynamo. The auxiliary dynamo which excites what would otherwise be the shunt field of the main dynamo is a small series machine whose armature is placed on the same shaft as the armature and driving motor of the main dynamo. The larger Motiograph Hi-Power generator is a separately excited compound dynamo.

Types of Armature Windings

To most of us the field windings of a generator are very easy to understand because of the simplicity of their arrangement. And it is therefore a simple matter to test individual field coils for short circuits and other defects. Armature windings, on the other hand, seem something of a mystery because of the complexity of their distribution and connections to the individual bars of the commutator, the automatic reversing switch which changes the induced AC to DC.

The main point to remember is that



Arc Drop $\underline{\text{equals}}$ Generator Voltage $\underline{\text{minus}}$ Ballast Drop

$$E_a = E_g - E_b$$

FIG. 6. Fundamental plan of a projector arc-lamp circuit. Shown are the points in the circuit at which a voltmeter should be applied to measure generator output voltage and the ballast and arc voltage drops.

the armature winding is a continuous winding, a closed coil. This winding is tapped at specified intervals, however, in order to bring out leads for connection to the commutator bars. The two common methods of winding armatures are the "lap" and "wave" windings.

In lap winding the ends of each individual coil wound on the slotted armature core are brought out to adjacent commutator bars, as shown in "A" of Fig. 2. In wave winding the ends of any one coil are widely separated on the commutator, and are thus somewhat more confusing to trace.

Lap winding, the simplest of all, is widely used for dynamos designed to deliver large currents at low voltage. If your generator has as many brushes as it has main poles, it probably has a lap-wound armature. Wave-wound dynamos usually have only two brushes, regardless of the number of poles.

As a rule, grounded, shorted, and open armature coils cannot easily be located and repaired by the projectionist. When such defects appear to exist in the armature, a replacement armature (together with shaft, commutator, etc.) should be put into service until the old one can be rewound and varnished by service men experienced in this highly specialized shop work.

Brushes and "Neutral Point"

The individual copper bars of the commutator are insulated from one another and from the shaft by specially processed sheet mica. Both the bars and the mica separators are held in place by wedge-shaped "V" clamping rings which fit into the recesses provided on the commutator bars.

The mica separating the bars is undercut to a distance of about 1/16 inch below the surface of the commutator. And the undercut must be maintained in order to avoid faulty contact of the brushes with the copper, and consequent severe sparking. The reason for this is the fact that copper is a trifle softer than mica, and hence tends to wear below the level of the mica.

Brushes are usually made of a special grade of graphite, a variety of carbon. These are wide enough to span 2 or 3 commutator segments, depending on the make and model of generator. The brushes are to be positioned at the "neutral point" when the dynamo is supplying current under normal load.

Sparking is at a minimum and the efficiency of the dynamo is at its highest when the brushes are positioned at the neutral point. At this point the brushes short-circuit only those coils in which no current is being generated at the moment, the current collected being obtained from other armature coils and transmitted to the commutator bars under the brushes by means of the continuity of the armature winding.

Should the brushes be placed off neutral, they would short-circuit "live" coils, and considerable sparking, as well as heating of the armature. would occur.

The neutral point shifts slightly around the commutator as the load increases or decreases. In modern theatre generators, especially in those having interpoles, the shift of neutral point is almost negligible.

Ballast Circuits

An arc-lamp circuit is very simple because it contains only two units, the ballast resistance and the arc, itself, connected in series, as shown in Fig. 6. Also indicated in this drawing are the points where the terminals of a voltmeter should be applied in order to measure (1) generator output voltage, (2) arc voltage-drop, and (3) ballast voltage-drop. Since these two "drops" represent the total resistance of the external circuit (disregarding line-drop), it is obvious that arc and ballast drops added together equal the output voltage of the generator.

Arc-drop is very important to the projectionist, since as this is the voltage at which the arc operates. To measure arc-drop in volts, strike the arc in one projector, and when the arc is burning normally, apply a DC voltmeter across the arc-lamp table switch. The reading will be the arc-drop.

One arc should also be burning normally whenever ballast-drop is measured with a voltmeter.

Ballast rheostats are necessary when multiple-arc generators are used, as explained in the previous installment. Moreover, there is a minimum ohmic value of ballast required to enable the arc to burn steadily without undue attention from the projectionists.

In the case of the LI mirror arc, the voltage absorbed by the ballast should be close to 20 or 25 volts, and certainly not less than 15 volts. The output voltage of the generator should accordingly be about 80 volts for thi• type of arc.

The HI arc requires somewhat less ballast than the LI arc. In the case of simplified HI arcs, the ballast should absorb from 15 to 20 volts, never less than 10 volts. A 45-volt generator is not quite adequate for best control and burn-

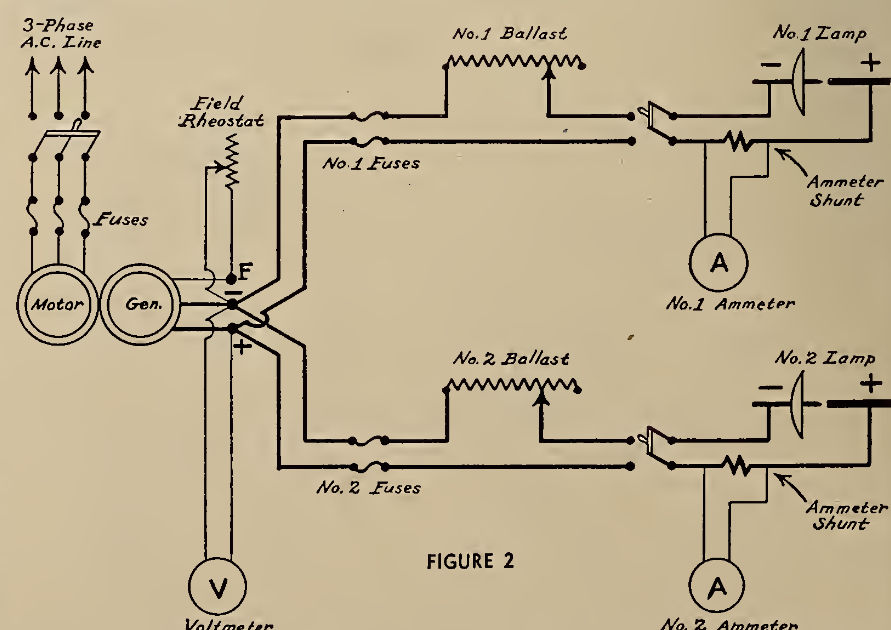


FIG. 7. A complete arc circuit having two projector lamps powered by a single multiple-arc motor-generator set. Note the hookup of voltmeter and ammeters. The entire circuit "floats," that is, there are no grounds in it.

ing of the arc: a 50-volt machine, however, is fairly satisfactory.

Higher-powered HI lamps—those of either the condenser or reflector type having rotating positives—require a proportionately greater ballast resistance. A 75 to 90 amp. arc., for example, operates satisfactorily with a ballast absorbing 20 to 25 volts, and not less than 15 volts. The generator output should be 80 volts, as an average. HI arcs in the 100-amp. range require about 25 volts ballast-drop and a generator output of 80 or 90 volts.

The current consumed by the arc and its associated ballast is measured in amperes. The amperage flowing in all parts of the arc circuit is the same, hence the ammeter shunt may be inserted anywhere in series with the line.

If the ammeter, itself, is located at a considerable distance from its shunt, as is sometimes the case, the meter must be calibrated to compensate for the line-drop of its leads. Many manufacturers furnish 25-foot ammeter leads. Since the meter is factory-adjusted to read correctly when these leads are used, care must be taken not to shorten or lengthen them.

The voltmeter on the control panel measures the generator output voltage. This voltage—and consequently the arc current—may be adjusted by the field rheostat which controls the generator shunt field.

In Fig. 7 we see a complete wiring diagram for two projector arcs supplied by a single multiple-arc dynamo powered by a 3-phase AC induction motor. Note that each arc has its own individual ballast resistance, and that neither side of the line is grounded. Manufacturers' wiring blueprints may look different and more complicated than the diagram given here, but in reality they are essentially the same. Comparison will prove helpful to the projectionist by increasing his ability to read electrical wiring diagrams.

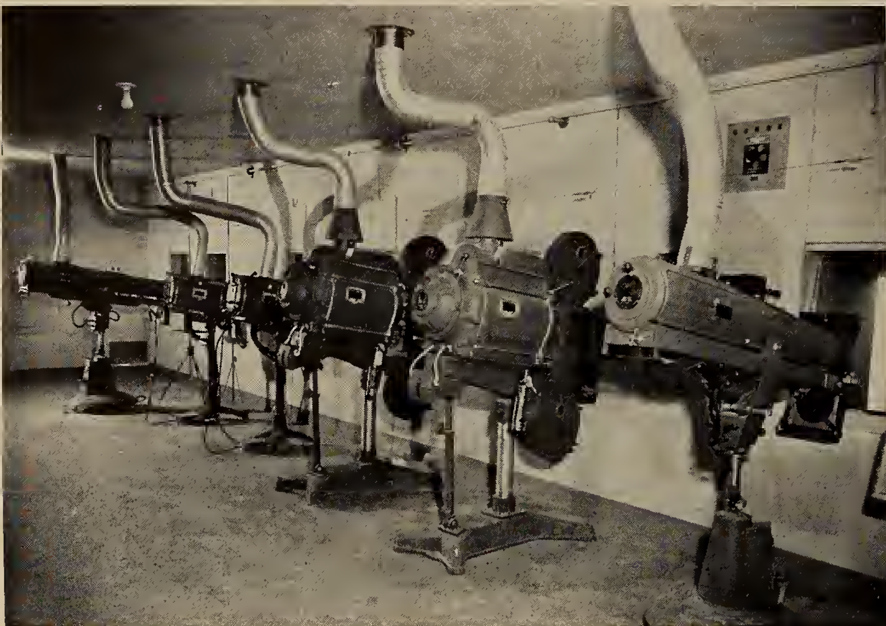
[TO BE CONTINUED]

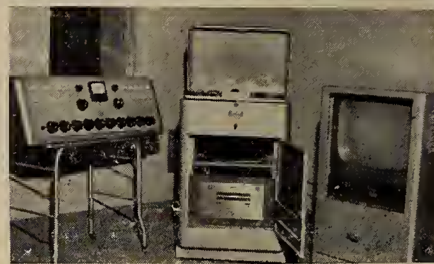
Color Council Elects Evans

Ralph M. Evans, head of Eastman Kodak's color control division, has been elected Secretary of the Inter-Society Color Council. The Council is composed of more than 20 member groups, including the SMPTE, American Psychological Association and Society of Industrial Designers. Its purpose is to stimulate and coordinate research, and standardize industrial practices, relating to color.

Standardization of color films has been and is Evans' responsibility at Eastman Kodak. He is the author of numerous scientific articles on color, and of the book, "An Introduction to Color," published in 1948 and reviewed by IP on Page 24, March, 1949 issue.

Los Angeles College Projection Room Sets Standard for Many Professional Theatres to Match





A PROJECTION room at a college which could well be used as a pattern in planning a professional theater projection room is that at the East Los Angeles Junior City College, Montebello, Calif. The room, said to have cost $25,000, is part of an expanded audio-visual program at this 6000-student institution.

The installation (shown in the accompanying illustrations) consists of two 16-mm Holmes projectors with Strong (Toledo) 1-mm Junior arclamps; also, two 35-mm Holmes projectors with Strong Mogul arclamps. Two Strong Trouper carbon arc spotlight projectors double as spotlamps and as slide and film strip projectors. The throw is 140 feet to a 24-foot screen. Space and portholes have been provided for Tv cameras.

There are also four Strong rectifiers, a film inspection and splicing table, reel magazines, 3-speed record player, a tape recorder, a 20-inch Tv monitoring receiver, amplifiers, and a 10-mike mixing console. J. M. Boyd Co., Los Angeles, installed the equipment.

Elaborate Electronic Equipment

The portable microphone mixing console for 10 microphones may be used on the stage or in the projection room for mixing the sound level. This is a 500-ohm unit of broadcast quality. The Concertone tape recorder is in a console, with a 3-speed Garrard record changer for playing 33 1/3, 45 and 78 r.p.m. records, and an Altec AM and FM tuner.

In another all-metal Hammertone-finish cabinet is a 20-inch Conrac Tv receiver for monitoring any stage programs televised, thereby making it possible, with the use of a 16-mm camera, to make permanent visual and sound record of these programs.

The power amplifiers consist of an Altec 126A 18-watt amplifier, driving a 256C 75-watt power amplifier, with an additional 75-watt power amplifier driven by the line amplifiers in the mixing console for public address. Switching is provided so that either amplifier may be used as an emergency amplifier. The sound-on-film speaker is an Altec AX4 speaker system which consists of two 803 low-frequency drivers, a dividing network and a 290 high-frequency driver.

There is a D.C. exciter lamp supply for each of the 35's, and one for the two 16-mm projectors. For arclamp power there are two 70-amp Strong 3-phase rectifiers, and for each 16-mm projector there is provided a Strong 4-tube, 30-40 amp. 220-volt rectifier.

IP LETTERS TO THE EDITOR

To the Editor of IP:

To date 26 theatres in New England have turned in a total of 480 pounds of copper drippings salvaged from their lamphouses. The drippings have been sold to a regular junk scrap dealer and via that route have found their way back to the smelters for reuse. The proceeds from the sale of this copper material have been turned over to the Heart Fund of the Variety Club of New England, Tent No. 23.

Inasmuch as a total of 480 pounds of copper scrap could be turned in by only 26 theatres, it is a simple matter of mathematics to figure out what the possibilities are if the more than 1000 theatres in New England would get behind this drive.

Now, this is something that is within the scope and control of projectionists. While the salvaged copper itself goes to help our war effort, it possibly permits the continued use of copper plating on projector carbons—and the proceeds from the sale of this salvaged copper help the pet charity of show business, namely, Variety Club Heart Fund.

All he has to do is send in the sweepings from the bottom of his lamphouses via film transportation trucks, without cost and they will have contributed to the cause for which we all should work.

JOE CIFRE
President, Joe Ciffre, Inc., Boston, Mass.

To the Editor of IP:

We solicit your help in completing a collection of technical magazines on the theater business. We need the following magazines to complete a back file:

Motion Picture Projectionist, Vol. 1, 1928: Feb., 4; April, 6; May, 7; July, 9. We will pay cash plus postage for these back issues.

It may interest you to know that an IA projectionist down in the Canal Zone, Panama, was most helpful to us in obtaining a complete file of another technical magazine for the year 1932, thus rounding out another of our collections, which fact prompted this request to you. L. L. BUTALA, Cinema Hobby Club, 630J Postal Building, WLA, Mar Vista, Calif.

BETTER FILM CARE

(*Continued from page* 11)

fect may be produced on the screen and the film may even become blistered from the intense heat. The in-and-out-of-focus effect usually begins during the second or third projection under conditions where the intensity is excessive. When this effect occurs, the focus shifts so rapidly from frame to frame that it becomes impossible for the projectionist to keep the picture on the screen sharply focused at all times. At these dangerously high intensities it is possible to blister the print so severely that it is no longer usable.

Two examples of blistered film are shown in Figure 9. At the early stages of blistering small bubbles occur between the emulsion and the base of the film and these areas have a dirty, grainy appearance. At later stages the bubbles break through the emulsion surface and appear as white spots with burnt edges. Blisters can be detected by examining the film by reflected light, at an angle close to the plane of the film, in which case they appear as tiny bubbles in the emulsion surface. More severe blisters can be seen from the base side of the film and have a whitish appearance. Heavy blistering, such as that shown in the lower illustration of Figure 9 can be seen from any angle. Blistered prints cannot be repaired or restored in any manner for further use in motion picture projection.

Keeping Aperture Cool

Several methods have recently been proposed for extending the safe limit for increased screen illumination. One method utilizes heat absorbing glass between the arc and the film. This filters out some of the infra-red portion of the arc spectrum, energy that only increases the temperature of the film and does not contribute to higher screen illumination. Many theaters employing higher amperages use a blower system for directing a current of air to the surface of the heat absorbing glass in order to keep the glass itself at a lower temperature. Air cooling has also been applied directly to the film in the aperture by means of high velocity air jets. These jets actually cool the film and permit it to perform satisfactorily in a hotter beam than could normally be tolerated. For the projector itself, water cooling has in some instances been applied to the gate in order to reduce the temperature of the metal in contact with the film and to make projector threading more convenient.

When maximum light output is desired from projection equipment, the

(*Continued on next page*)

BETTER FILM CARE

(Continued from preceding page)

arc current should never be increased arbitrarily without first ascertaining by test whether such procedure is liable to cause film damage.

Testing Projector Performance

Final testing of any installation of projection equipment should include the projection of test film to insure that the equipment is operating properly and that misadjustments will not cause damage to prints.

The following test procedure is recommended for film testing of projection equipment:

FILM: Eastman Fine Grain Release Positive Safety Film, Type 5302.

PROCESSING: Normal. The image should contain dark areas distributed about the frame and especially near the center.

AGE: *Film can be used for only one test.* Previous projection makes the film test less critical, and the results difficult to interpret.

STORAGE: Film must be used within six months of the processing date. The processed test film should be kept in a closed metal film container.

TEST LOOP: Nine-foot loops are recommended. Splice a fresh 9-foot piece into a loop, and thread into the projector. Magazine doors will probably have to remain open, and the loop may have to be guided by hand to prevent its twisting off the sprockets.

TEST: Strike the arc and burn-in at least 1 minute. In general, set to the maximum operating current, condenser setting, screen light, etc. available to the projectionist. Start projector, open dowser and change-over. If possible watch the projected picture on the screen, refocusing frequently as needed. Count 30 to 50 revolutions of the loop (3 to 5 minutes projection). Stop the projector and remove the film for examination.

EXAMINATION: Look first for any blistering of the film. Examine the emulsion side by reflected light at an angle nearly coincident with the plane of the film for any small raised blisters. A hand magnifier is helpful but not essential. Severe blisters will show on the screen and on the film as white pinholes in the image. ANY SIGN OF BLISTERS INDICATES THAT THE ARC INTENSITY IS TOO HIGH OR THAT FAILURE OF THE FILM PROTECTIVE DEVICES HAS OCCURRED. The regular prints are in danger of damage under any conditions which will produce blisters on the test loop.

Look also for excessive scratching, perforation damage, or other evidence of faulty mechanical adjustments in the projector.

If the test loop is undamaged, then the projection equipment will handle normal films safely (when operated at the arc current, condenser settings, etc. at which the test was made).

CONCLUSION

It is a well established fact that film damage does occur and that it may be caused in a variety of ways and in any one of the various places where film is handled. The material offered here has been presented with the sole purpose of helping to reduce unwarranted film damage and in no way is it intended as a condemnation or criticism of any single individual or group of individuals.

The information, suggestions and recommendations contained herein are based on the results of numerous investigations and observations related to various types of film damage which have been brought to the attention of the Eastman Kodak Company over a period of many years. It is our sincere hope that this material will foster a greater spirit of cooperation among all individuals throughout the industry in an effort to eliminate needless waste and to secure the maximum useful life for all motion picture prints.

New Recording Method

A new recording method, producing an optical sound track that can be either variable-density or variable-area, as preferred, will be introduced by Robert Dressler, Director of Research and Development for Paramount Pictures, on April 16th. Dresssler will present a paper and demonstration before a meeting, on that date, of the SMPTE's Atlantic Coast section. Heart of the new recorder is a crystal that is stressed by the voltage to be recorded and modulates the recording lightbeam proportionately. E. M. Stifle, Chairman of the Atlantic Coast Section, announced the meeting.

For Uncle Sam—& *YOU*
SAVE EVERY OUNCE OF COPPER

IA-IP AMATEUR RADIO

Marion Sanders, IA Local 507, at his "ham" radio setup (W4PKT) in Macon, Ga.

Comes to the forefront once again the irrepressible Kanaga of California to stir into action the hundreds of IA men who have the "ham" radio bug—an organism which is impervious to penicillin and all other noted bug-killers. "Ham" radio is a disease in perpetuity.

Amos now proposes (and has won wide ready acceptance for) the idea of monthly awards to all IA radio "hams" who succeed in contacting 10 or more brother IA men. Award certificates, signed by IA President Dick Walsh will be given to every IA man who qualifies. The rules are simple, as follows:

Simple Participation Rules

Send to Amos your log sheet showing any 10 IA radio amateurs worked.

IA Local Union numbers and date worked must be included.

No QSL cards are necessary.

To those most enterprising of IA men who work not 10 but 25 brother IA men will go a special Gold Award for exceptional merit, also duly certified.

Amos is particularly concerned about a steady expansion of the official IA-IP listing of radio "hams". If any IP reader knows of a brother IA ham who is not included in this fraternal listing, by all means tip him off to send in his name and other pertinent data to Amos, whose address is listed at the end of this item.

The official IA-IP calling frequencies are as follows:

28,700—14,250—7250—and 3950

Suggested Time Schedule

Amos suggests the following time schedule for the IA-IP gab fest: each Monday at 10 A.M. (Pacific Standard Time); 12 Noon (C. S. T.) and 1 P. M. (E. S. T.), on approximately 28,700, QRM permitting. Join Amos and the rest of the disease-laden "hams" at that time.

Altec Expands Facilities

To maintain peak service to its clients in the face of current demands Altec Service Corporation has set up a new division to cover the area from Newark, N. J., on the east to Pittsburgh, Penna., and from Syracuse, N. Y., southward to Norfolk, Va. Headquarters of the new division are at 642 Broadway, Newark. L. J. Patton is the new division manager; and Glenn Pinckney and D. A. Peterson are his North and South branch managers, respectively.

Altec's Northeastern division, now relieved of the responsibilities taken over by Patton's new group, still comprises the Metropolitan New York area, all of New England, Long Island and the Hudson River Valley. C. S. Perkins remains its manager; R. E. (Red) Pierce has been promoted to manager of its Boston branch and Ralph Kautzky named manager of the New York branch.

PROJECTION SCREENS

(*Continued from page 6*)

those almost forgotten nickelodeon days when the picture was thrown on a white plaster wall. For the drive-in, using in-car speakers, needs no perforations in its screen; having a very large picture, it can't afford to waste light on perforations; being outdoors it does not want to expose to weather any kind of fabric, whether woven or plastic. The drive-in, therefore, projects on a flat, solid surface. But a cycle is not a circle; the surface of the drive-in screen is not plaster. It is a special paint—a drive-in screen paint—in which the pigment is titanium dioxide.

SMPTE CONVENTION

(*Continued from page* 12)

high-speed techniques used in industry, and Thursday to photography.

On Friday Chester Beachell of the National Film Board of Canada is scheduled to present a "simplified preamplifier with high gain, low distortion and exceptional dynamic range and frequency response" built out of only 12 components, including tubes. A. L. Holcomb will describe a non-rotating device for converting single-phase 115-v. a.c. to three-phase 230-v. a.c. Willy Borberg of General Precision Laboratory will analyze a modulated air blast method of reducing film buckle in the presence of high intensity projection light and its accompanying intense heat.

SMPTE Committee Sets Goals For Good Screen Illumination

In a circular letter dated March 10th, which the Society of Motion Picture and Television Engineers has sent to the 125 theatres that cooperated in its screen brightness survey, W. W. Lozier, Chairman of the Screen Brightness Committee, sets forth the following desirable goals for screen illumination:

1. The center screen brightness should be between 9 and 14 foot-lamberts.
2. The illumination at the two opposite sides of the screen should be identical.
3. The illumination at all four corners of the screen should be identical.
4. The illumination at any point of the screen should be identical with both projectors.

Committee Chairman Lozier concedes that "we cannot at this time specify just how much departure from these goals should be tolerated." Also that as yet "there are no recognized standards in regard to distribution" of light over the area of the screen. "We are not able to say just how much unbalance" (of illumination as between two sides of the screen) "should be tolerated. However, in cases where the light at one side of the screen is more than 1.5 times that at the other . . . the screen will certainly appear objectionably brighter on one side. . . ." With reference to difference in illumination at changeover: "We cannot say just how much difference should be tolerated. . . . It is the writer's experience that differences between projectors of 20 per cent or more are noticeable and objectionable. . . ."

The work of the Committee is continuing in an effort to establish some of these limits which now do not exist.

LIGHT AND ANGSTROM UNIT

(*Continued from page* 14)

comparison of these different units of measurement. It also shows that the range of available measuring units is comparable to the range of electro-magnetic wavelengths. That unit is used which best suits the length of the particular wave to be measured.

Wavelength and Frequency

From this it is obvious that the Angstrom Unit scale is considerably more practical for measuring wavelengths of visible light than any of the other common units. Accordingly, the visible spectrum is thus scaled in the accompanying illustrations. The infra-red or heat waves are shown scaled in microns. The radio waves are shown measured (according to early practice) in meters. Radio waves now are, of course, more commonly scaled in frequencies than wavelength. Light similarly can be scaled in frequencies. It has been noted above that violet light at the edge of the ultra-violet has a frequency of 750 million million vibrations per second (750 mega mega cycles) and also a wavelength of 4000 A.U., and that both of these statements mean exactly the same thing. It is obvious that the A. U. is the more convenient unit to use for light, just as kilocycles and megacycles are most convenient for radio.

IA ELECTIONS

LOCAL 162, SAN FRANCISCO, CALIF.

Thomas J. Kearney, *pres.;* Otto G. Roush, 1*st vice-pres.;* Ernest H. Langley, 2*nd vice-pres.;* Paul Artigues, 3*rd vice-pres.;* Merv. K. Wagner, 4*th vice-pres.;* Al B. Cohn, 5*th vice-pres.;* John A. Forde, *bus. rep.;* Frank W. Costello, *sec.-treas.;* Antone J. Salemi, *sgt.-at-arms;* Roush, Langley, Artigues, Wagner, and Cohn, *exec. board members.*

LOCAL 188, KALAMAZOO, MICH.

Harry Williams, *pres.;* Harold Sargent, *vice-pres.;* Leeman J. McCarty, *bus. rep.;* Glen VanderLaan, *sec.;* Howard Woods, *treas.*

LOCAL 409, SAN MATEO, CALIF.

Charles J. Wagner, *pres.;* George Malm, 1*st vice-pres.;* Robert Dunbar, 2*nd vice-pres.;* Raymond Cayla, 3*rd vice-pres.;* Richard Rhodes, 4*th vice-pres.;* Rudy Ivancich, 5*th vice-pres.;* John Turturici, *bus. rep.;* Amos R. Kanaga, *sec.;* Howard Bobbitt, *treas.;* Harry Hilyard, *sgt.-at-arms;* Wesley Schenkel, Storme Wade, Joseph Turturici, *trustees;* Malm, Dunbar, Cayla, Rhodes, and Ivancich, *exec. board members.* John Turturici and Raymond Cayla, *del. to A F of L Theatrical Federation* and to *IATSE District Council No.* 1 *meetings.*

LOCAL 586, COLUMBUS, NORFOLK, HASTINGS, GRAND ISLAND and YORK

W. E. Snyder, *pres.;* F. L. Kerwood, *vice-pres.;* Leo Tews, *bus. rep.;* Louis Christofferson, *treas.;* Conrad Kreiger, *sec.;* E. O. Hart, *fin.-sec.;* Fred Driskell, O. P. McCurdy, *exec. board;* R. R. Kerwood, R. C. Berger, Alva Brooke, *trustees.*

CALIFORNIA DISTRICT COUNCIL NO. 2

William W. Wise (San Diego L. 297) *pres.;* Ralph F. Adams (Santa Ana L. 504), *vice-pres.;* Alonzo S. Bennett (Long Beach L. 521), *sec.-treas.;* Gilbert A. Lahlum (Long Beach L. 521), *sgt.-at-arms.*

Technicolor Breaks Records

Technicolor Motion Picture Corporation broke all production records in 1951, Dr. Herbert T. Kalmus, President and General Manager, reported to stockholders early in April. The number of feature films produced in Technicolor increased from 70 in 1950 to 76 in 1951, a gain of 8 percent; footage of color prints ran to more than 392 million feet as against a previous 312 million, for a gain of 25 percent; sales crossed $28 as compared with a previous $23, a gain of 21 percent. Further progress is forecast for 1952, when the number of Technicolor features in production or preparation or under contract has already risen to 89 as compared with 1951's 76.

Meanwhile John Nickolaus, veteran superintendent of photography at MGM, predicted in Rochester, N. Y., where he was studying Eastman Kodak's latest color processes, that all pictures will be in full color in the near future, and black-and-white a thing of the past. Among other advantages, this will allow actresses to wear ordinary street cosmetics and male players no make-up at all, Nickolaus believes.

Radio-TV Production Off

Combined production of radio receivers and TV receivers declined nearly one-half (43 percent down) in the first two months of 1952 as compared to the corresponding period of 1951, the Radio and Television Manufacturers Association reports. The combined output this year totalled only 2.2 million sets as compared with the previous figure of 3.8 million. Production of radio sets was significantly greater than that of TV receivers —814 thousand TV units against 1,391 thousand radios.

Eastman Kodak Promotes

Kodak-Pathe, Eastman subsidiary in France, has promoted Lucien Vacher, assistant general manager, to be general manager; and Jacques Tassel, deputy manager, to become manager of the Vincennes plant.

THREE-DIMENSIONAL PROJECTION IN EUROPE

(*Continued from page* 9)

ter of taste. If the stereopoint—that is, the point where the two optical axes meet — is adjusted to the nearest plane of the object photographed the whole object will appear to lie behind the screen; if the stereopoint is adjusted to the middle of the depth of the object half of the object will appear to protrude from the screen into the audience. In my opinion this effect should be used very sparingly—for example, a gun pointing at the audience. In shorts and in publicity films it may be used more freely. Generally, however, the effect of a part of the object sticking out of the screen that borders it is not artistic, although the public may think it amusing."

Turning aside from considerations of photography Mr. Weber looks into projection room requirements from the point of view of current European practices and his own preferences.

Stereoprojection

"In my opinion, and I have studied literally more than 1,000 patents on this subject, it is not possible to project stereofilm satisfactorily without some alterations in the projection room. The synchronized dual projector system is essentially obsolete for various reasons. A single projector is called upon to project simultaneously a pair of full-sized or nearly full-sized images which are positioned alternatively on a single film, at 24 film movements per second.

Apart from the problem of how to distribute the arclight evenly over the enlarged gate, a problem for which Mr. Norling describes various ingenious solutions, the projector needs larger sprockets—twice standard size for full-dimension images or 1½ times standard size for the Wideview images mentioned above. It needs a proportionately enlarged gate. It needs either two separate lenses, placed one above the other, or a single large diameter lens with a pair of wedgeprisms mounted in front of it to superimpose the images. These projection lenses should be at least f/2.0, preferably f/1.6 or f/1.4.

"Finally, there will not be in the beginning, nor for years to come, enough stereofilms to provide continuous three-dimensional showings. A dual-purpose projector, capable of showing either stereo or "flat" films is possible. The sprockets, the gate and the lens (if a double lens is used) must be interchangeable. The German Askania Camera and Projector Manufacturing Company are now studying a convertbile 35-mm projector of this kind.

Stereoviewing

"Polaspectacles have now been internationally agreed upon as providing the best viewing method so far devised. In a year or so I expect to be in a position to offer economically and practically useable autovision screens. But in sizes up to about 7 feet wide and therefore for non-theatre showings only. Autovision screens will always impose more restrictions on the spectators than the polarized light method. Polaspectacle steroprojection of true-to-life three dimensional images has now become a fully satisfactory and practical proposition."

Gerald Pratley, writing in Films in Review, a monthly publication of the U. S. National Board of Review of Motion Pictures, Inc., comments favorably on the two-projector, 3-dimensional films shown at the Festival of Britain. A condensation of his remarks follows:

"In spite of all I had read and heard about the 3-dimensional films shown at the Festival of Britain, I had never imagined anything could be so fascinating, so truly exciting. The magic of Norman McLaren began working its unbelievable trickery in the film used to introduce the

audience to 3-dimensions, called *Now Is the Time* (to put on your glasses). Expectantly, the audience donned polarized spectacles, which are a great improvement over the old red and green ones. In the projection room two projectors, placed nine inches apart and fitted with special lenses, simultaneously threw on the screen projections of two prints of film. The audience's glasses translated this double image into a single, clear picture in three dimensions. . . .

"McLaren's second film, *Around Is Around*, is the most perfect and beautiful of all his remarkable attempts. . . . For the first time in motion pictures we see *around* a spherical shape, instead of seeing it flat. This alone is an exciting revelation. . . . Aided by superior Technicolor photography, and an understanding and complementary score by Louis Applebaum, McLaren's creation has unrestrained imagination and power. Like a symphony filling a concert hall, this 3-dimensional film seems to leave the screen, and appears so real and close that one is tempted to reach out and touch it. . . .

Stereophonic Sound

"The problem which faced Louis Applebaum . . . lay not so much in the content of the music, which is light-hearted and in waltz-time, but in correctly assigning the music to respective parts of the theatre. In order to match the added depth of the 3-dimensional film, the sound has to have direction. If a character walks from one side of the screen to the other the sound has to follow him. And when in stereoscopic films an object appears to come right out from the screen over the audience, the sound must travel from the front to the back of the theatre.

"To achieve this astonishing effect the designers of the Telecinema, where the Festival of Britain films were shown, introduced stereoscopic sound to complement stereoscopic vision. This entailed the use of four batteries of loudspeakers, one behind the screen, one each in the left and right corners of the screen, and one at the back of the auditorium. These four loudspeakers were fed from four magnetic soundtracks recorded on a single strip of 35-mm film. The film runs in a magnetic sound reproducer unit which is mounted behind the projectors and synchronized with them. By means of a 'stereophonic mixing console' the four tracks are picked up and fed through to the loudspeakers to which they are connected.

"The third and last of the 3-dimensional films shown at the Festival of Britain was an excerpt from the British-made, uncompleted *Royal River*. The excerpt is called *The Distant Thames* and is an essay in realism. It does not pretend to be more than a travelogue.

"The 3-dimensional cameras were placed on the deck of a boat and sailed down the Thames. The scenery, reproduced in delightfully subdued color, had 3-dimensional depth and a truly remarkable and pleasant effect. The foreground was clearly separated from the background, with the result that the spectator actually felt that by leaning slightly forward it would be possible to stroke the swans on the Thames. William Alwyn's music skillfully kept the mood.

"I see no reason why stereoscopic films, with their added realism, should not prove acceptable to everyone and inaugurate a new era in the history of the cinema, involving as great, or greater, changes in film technique as did the introduction of sound.

"I cannot imagine anyone wanting to stay at home to look at television when stereoscopic films have so much to offer!"

G. E. in Production on UHF TV

Low-power ultra-high-frequency TV transmitters are now in production at General Electric Company's Syracuse, N. Y., plant, Harold G. Towlson, G. E. transmitter engineer, announces. Development of larger UHF transmitters, to meet the needs of communities of every size, is under way, Towlson adds.

New TV Relay Link

A new radio-relay link which will ultimately be capable of carrying TV programs has been opened by A. T. & T. between Washington, D. C. and Charlotte, N. C. The link is 612 miles long and comprises nine relay stations. Some of the relay antennas are as high as 290 feet above ground.

GPL Achieves f- 0.78 Optics via 14 Months of Math

Showing the GPL f/0.78 optical system. The correcting lens, shaped to the curvature determined by many months of mathematical computation, is held by Louis Pierre Raitiere, left, its creator, and William Barberg, associate head of GPL development department.

A PROJECTION system with a working speed of f/0.78 (!) has been developed by General Precision Laboratory for large-screen theatre television and is now in quantity production.

The system is a modification of the conventional Schmidt optics, with important superiority in efficiency, it is explained. GPL uses the new optical system to spread the image formed on the face of a 7-inch TV tube over a theatre screen measuring 19 by 25 feet. Greater screen brightness, as well as uniformity of illumination over the entire picture area with no center hot spot, are claimed.

Throw, for the 25-foot picture, is 73 feet.

The 7-inch tube faces a spherical mirror 26 inches in diameter, coated with an extremely thin layer of aluminum. Thinness of the mirror coating is a minor factor in the efficiency of the system, since experiment showed that even when the coating was not altogether opaque and a little light was lost through it, efficiency was better than with a heavier coating.

Diaphragm Stops Down Speed

Used with the tube and mirror is a correcting lens or plate, 22.2 inches in diameter. All three fit into a projection barrel with the lens nearest the theatre screen, the mirror at the opposite end of the barrel, facing the lens, and the TV tube midway between, facing the mirror. A diaphragm or fixed iris is also mounted near the center of the barrel. It is this diaphragm that stops down the speed to f/0.78. Without it the rating would be f/0.67.

Accuracy of the double curvature of the correcting lens is the principal reason for the superior efficiency of the new system, GPL reveals; and this accuracy was achieved by painstaking, step-by-step computation lasting over a year. Louis Pierre Raitiere, French-trained scientist, with a graduate mathematician for assistant, calculated a detailed light-ray path for 100 separate, individual points on the lens profile. Each such calculation required 26 hours time; 100 of them took a total of 14 months. From the formula thus derived, American Optical Company casts the lenses for GPL, using lead glass.

A porous mold having been made to the calculated profile, the flat glass plate, placed over this mold, is heated to the point of plasticity; then vacuum is applied through the porous mold and the glass gradually drawn down to fill in the profile. After it has cooled its rear surface is ground optically flat, producing a plano-profile lens which is then given an anti-reflection coating.

The entire assemblage—optical barrel, mirror, TV tube, iris and lens—is hermetically sealed to keep out dust that would otherwise be attracted by the high dc voltage of the tube, and cooled by a system of recirculating air. It constitutes the latest improvement in GPL's direct-projection system of theatre television.

Nickel OK for Electrical Gear

Nickel can be used in functional parts of electrical equipment, the National Production Board ruled as of April 1st. Because of shortage of the metal, the NPA has issued a long list of products in which it cannot be used at present, either in pure form, as an ingredient in alloys, or as a coating. In projection room equipment nickel is used principally as an alloy ingredient for magnet cores and for stainless steel. Such use is now approved.

Magnet Material Scarce

Manufacturers of permanent magnets now have an active program under way for salvaging grindings and scrap, the Department of Commerce announces. Purpose is to conserve nickel and cobalt, magnet alloy ingredients, which are in short supply. For the same reason the magnets of magnetron tubes, extensively used in radar, are now being reclaimed by the Armed Forces, the Department reveals.

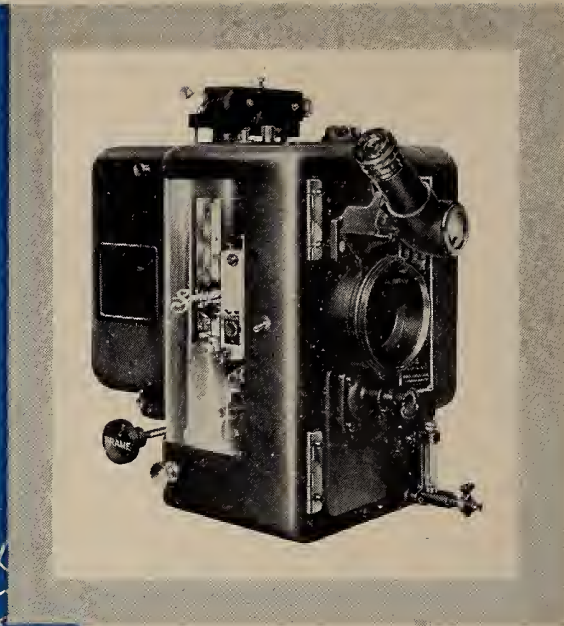
Nate Golden in Germany

Nathan D. Golden, Director of the Motion Picture and Photographic Products Division of the Department of Commerce, and for many years one of the strongest links between this industry and the United States government, is in Germany, where he will deliver the opening address at the International Photo-Cine Exhibition and Trade Fair at Cologne. He will attend the Film Festival at Cannes, and visit motion picture centers on the Continent and in England, before returning home.

Starrett to New York

Eastman Kodak's Warren D. Starrett, until recently assistant to the manager of the company's Chicago branch, has been transferred East to be assistant manager for sales of the New York branch.

3 makes a crowd!



Your projectors . . . your sound systems . . . your in-a-car speakers.

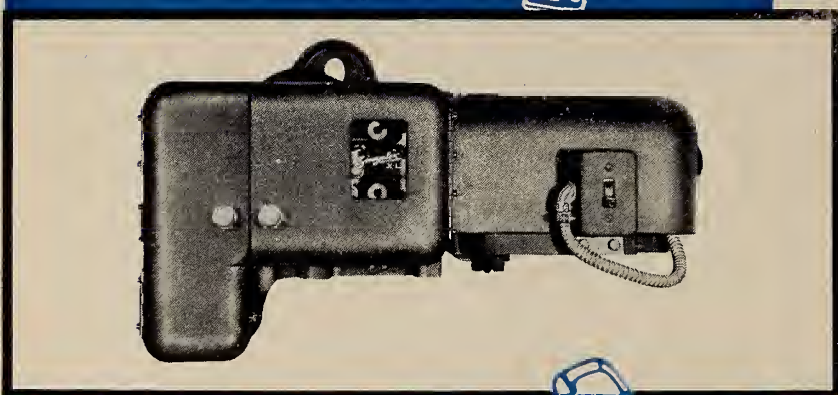
These three, more than any other drive-in equipment, are what makes a crowd . . . A happy, satisfied crowd . . . A crowd that will return to your theatre time after time to enjoy fine motion picture entertainment.

The crowd-wise, profit-wise theatre owner will see to it, therefore, that his projector, soundhead and speakers are the finest! . . . And throughout the world, there is none finer than SIMPLEX!

SIMPLEX PROJECTORS for the thrillingly bright picture patrons demand . . . the steady, flicker-free picture patrons will return to see!

SIMPLEX SOUND SYSTEMS for the crystal-clear tone, the great frequency range that makes every picture more enjoyable, every theatre more popular!

SIMPLEX IN-A-CAR SPEAKERS for consistently superior performance under all weather conditions! Built to assure perfect, uninterrupted reception!



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PROJECTION and SOUND SYSTEMS

- **Manufactured by International Projector Corporation**
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INTERNATIONAL PROJECTIONIST

MAY 1952

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With Which Is Combined PROJECTION ENGINEERING

HENRY B. SELLWOOD, *Editor*

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MONTHLY CHAT

IN THESE days of basic reorganization of the industry, when theatres are closing down at a pace probably unknown since the depression, it is instructive to observe, and to check the observations of others, as to the *kind* of theatre that seems to be closing. Perhaps someplace there is some well-kept, well-run, quality theatre that has shuttered its doors—but where? No doubt in any year, under any circumstances, some few well-kept, well-run houses have found competition, or changing conditions, too difficult to meet. Yet the almost universal impression (confirmed in conversations at the recent convention at which members of the SMPTE gathered from all parts of the United States and Canada) seems to be that the "shooting gallery" is the theatre finding difficulty in surviving today, and often not surviving.

"The death of the dump" was the way one person described, in private talk at the Convention, the change that seems to be coming over the character of our industry. By contrast with the "death of the dump" the well-maintained, well-operated house seems at this moment not only to be surviving happily, but to be reporting an actual upswing in attendance and profits.

The moral for the projectionist seems to be reasonably clear—if you are working in a "dump" your job probably is not too safe; if you are turning out high quality projection and sound in a quality theatre, you probably have nothing in particular to fear so far as job safety is concerned.

The reason seems fairly clear too — TV. Why pay for third-rate entertainment? It's available at home for free, or at the corner tavern for the price of a couple of beers. The 60 or 80 or 90 cents the shooting gallery asks for third-rate entertainment is more than the same is worth—today.

To the contrary, there is no place except the theatre where anyone can find well-presented picture entertainment — clear, steady, bright, probably in full color, accompanied by stirring and dramatic sound. This the tavern cannot offer, nor the living room either. This, it appears, they still come for and pay for. The kind of theatre that offers well-presented entertainment is not the kind that is closing down.

The projectionist has in this situation two very obvious responsibilities — to himself, insofar as the continuance of his job is at stake, as well as to his employer. The first is, of course, to put on the very best show possible with the equipment provided, and (so far as permitted) to put that equipment and keep it in condition to do its best work. The second relates to the limits of the projectionist's power — he *can't* put a bright picture on a dirty screen and he does not have power to change the screen; he can't pump good sound

(*Continued on Page* 30)


Destry will ride tonight—positively
NO QUESTION, the show will go on—tonight—and every night . . . go on with all the blood-and-thunder that distinguishes the new-day Western—a stellar example of work inspired by modern technics, equipment, and materials.
Here, too, is a stellar example of the way the Eastman Kodak Company functions through the Eastman Technical Service for Motion Picture Film.
For, in addition to aiding studio and laboratory in film selection and processing, representatives collaborate with exchange and theater in helping solve problems of projection—help check film and equipment . . . make light measurements, determine proper levels . . . all to help assure good showings, black-and-white or color.
To maintain this service, the Eastman Kodak Company has branches at strategic centers . . . invites inquiry from all members of the industry. Address:
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West Coast Division
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Hollywood 38, California

INTERNATIONAL PROJECTIONIST

VOLUME XXVII MAY 1952 NUMBER 5

Standards Promote Better Projection

PROJECTION and sound are better in quality—much better—than they possibly could be if accepted standards did not exist. Standards tell the studio and manufacturer, as well as the projectionist, what physical, electrical or optical considerations each should meet, or what performance factors each should achieve, in order to produce the best projection and sound quality that can reasonably be expected in the current state of the art.

Officially accepted standards are approved by the American Standards Association (ASA) but suggested, created and submitted by the Society of Motion Picture and Television Engineers (SMPTE), or the Motion Picture Research Council, or both. All three organizations cooperate closely in procedures relating to standards.

Some accepted standards are of direct interest and importance to the projectionist. Others are important to him only indirectly. It is certainly essential to any projectionist that prints reaching his projection room adhere to accepted physical standards.

Suppose, for example, the sprocket hole spacing were non-standard and did not fit the sprockets! Such things did take place in the very earliest days of the industry when a few misguided manufacturers imagined they might benefit if no other film could run on their projectors except their own, or if no projector except theirs could show their prints—but this item of ancient history is now only indirectly of interest to the projectionist. Standardization has taken care of that detail for well over a generation. Established standards for such details as release print dimensions and perforations directly concern only manufacturers of film and equipment, not the projectionist. His concern with them is limited to the fact that they assure that prints reaching his projection room will fit his projectors; otherwise the projectionist has no further interest in standards relating to studios or factories only.

On the other hand, the "American Standard Specification for 35-Millimeter Sound Motion Picture Release Prints in 2000-Foot Lengths" is of the most positive direct interest to every projectionist. This standard describes what the film should be like when it reaches the projection room. It defines the length of head and tail leaders, the number of frames to each, the printing on each frame, the cue marks—it constitutes a complete description of what a standard 2000-foot reel of film should be and thus serves the projectionist as a practical (an unanswerable) basis of comparison against which to estimate the condition of the reels he receives.

Other standards of direct interest to the projectionist specify performance characteristics—as for example, screen brightness; still others describe equipment characteristics as in test films or in screen dimensions.

Classification of Standards

For ready identification and reference all standards, in or out of the motion picture field, are numbered according to a universal decimal classification. Most of the standards with which projectionists are concerned directly or indirectly fall into the classification Z22. This identification is followed by a sub-classification and often by a date—for example, the standard for 2000-foot release prints above mentioned is classified completely as Z22.55-1947. Other projection and sound standards may be classified either under Z22, Z38, or PS22, *etc.*,—with a sub-classification and perhaps a date in each case.

Some of the standards not of strong direct interest to projectionists include, for example: Z22.36-1947, "Cutting and Perforating Dimensions for 35-Millimeter Motion Picture Positive Raw Stock," the indirect importance of which has already been stressed—or Z22.59-1947, "Photographing Aperture of 35-Millimeter Sound Motion Picture Cameras." On the other hand, "Picture Projection Aperture of 35-Millimeter Sound Motion Picture Projectors" (Z22.58-1947) comes close to the projectionist; Z22.39-1944, "Screen Brightness" provides him with a direct measure of comparison for judging the performance of his own equipment; Z22.78-1950, "American Standard Dimensions for Mounting Frames for Theatre Projection Screens" is of obvious applicability in every theatre; to mention a few.

The Standards are published—otherwise they would be of no use. Their usefulness lies in their availability for reference to all who may need them. However, the promulgating organizations, the ASA and the SMPTE (in the case of standards applying to this industry) are not profit-earning enterprises but service organizations; they do not have business-type incomes out of which they could defray the cost of distributing standards gratis. Single standards can be purchased from either of these organizations; in addition, the SMPTE has complete sets of all 66 standards pertaining to this industry for sale with or without a loose-leaf binder.

But since the object of these organizations is service and not profit, IP has been granted permission, both by ASA and by SMPTE, to reprint here, as a service to its readers, as many of these copyrighted standards as IP believes may be of interest or help to them. That series begins on the following page.

Specification for 35-mm Sound Motion Picture Release Prints in Standard 2000-Foot Lengths (Z22.55–1947)

1. Protective Head Leader

1.1 The protective leader shall be either transparent or raw stock. When the protective leader has been reduced to a length of 6 feet, it is to be restored to a length of 8 feet.

2. Identification Head Leader (Part Title)

2.1 The identification leader shall contain 24 frames as specified below:

(a) 6 frames on which are plainly printed, lengthwise with the film, in white letters on a black background: (a) reel number, (b) picture title.

(b) 18 frames on each of which are plainly printed in black letters on white background: (a) type of print, (b) reel number (Arabic numeral not less than ¼ of frame height), and (c) picture title.

3. Synchronizing Leader

3.1 The synchronizing leader shall consist of 20 frames ahead of PICTURE START mark, then 12 feet, including picture start mark, to picture. This leader shall be opaque except as specified below: In the center of the first frame there shall be printed across the picture and sound track area a white line 1/32 inch wide upon which is superimposed a diamond ⅛ inch high. In this same frame shall be printed "SOUND START," in white letters on a black background.

The next 15 frames may be used by the studio for sensitometric or other information. If not so used, this leader shall be opaque.

The picture start mark shall be the 21st frame, on which is printed "PICTURE START" (inverted) in black letters on white backgronnd. The standard camera aperture height (American Standard Z22.59-1947) of 0.631 ±0.002 inch shall be used in the photography of this frame and all others between PICTURE START mark and beginning of picture.

From picture start mark to picture, leader shall contain frame lines which do not cross sound track area. Beginning 3 feet from the first frame of picture, each foot is to be plainly marked by a transparent frame containing an inverted black numeral at least ½ frame height. Footage indicator numerals shall run consecutively from 3 to 11, inclusive. In the frames in which the numerals "6" and "9" appear, the words "six" and "nine" (also inverted) shall be placed immediately below the figure, to eliminate the possibility of misreading in the projection room dne to the similarity between the inverted numerals.

At a point exactly 20 frames ahead of the center of each footage numeral frame, there shall be a diamond (white on black background) ⅛ inch high by ⅜ inch wide.

4. Picture Section

4.1 *Picture.* It is recommended that picture action start and finish on fades wherever possible, otherwise significant sound should be kept at least 5 feet from the start and finish of the picture. The length of a standard reel shall be between 1750 feet minimum (except when absolutely unavoidable) and 2000 feet maximum.

4.2 *Motor Cue.* The motor cue shall be circular opaque marks with transparent outline* printed from the negative which has had 4 consecutive frames punched with a die 0.094 inch in diameter. The center of these holes is to be halfway between the top and second sprocket holes 0.281 inch from the right-hand edge of the film with heads up and emulsion toward the observer. Following the 4 frames containing the circular opaque marks there shall be 10 feet and 12 frames to the beginning of the changeover cue.

4.3 *Changeover Cue.* The changeover cue shall consist of 4 frames containing circular opaque marks punched similarly to and of the same dimensions and position on the frame as the motor cue. Following the changeover cue marks there shall be 18 frames to beginning of runout trailer.

5. Runout Leader

5.1 The runout leader shall be opaque and 3 feet in length.

6. Identification Tail Leader (End-of-Part Title)

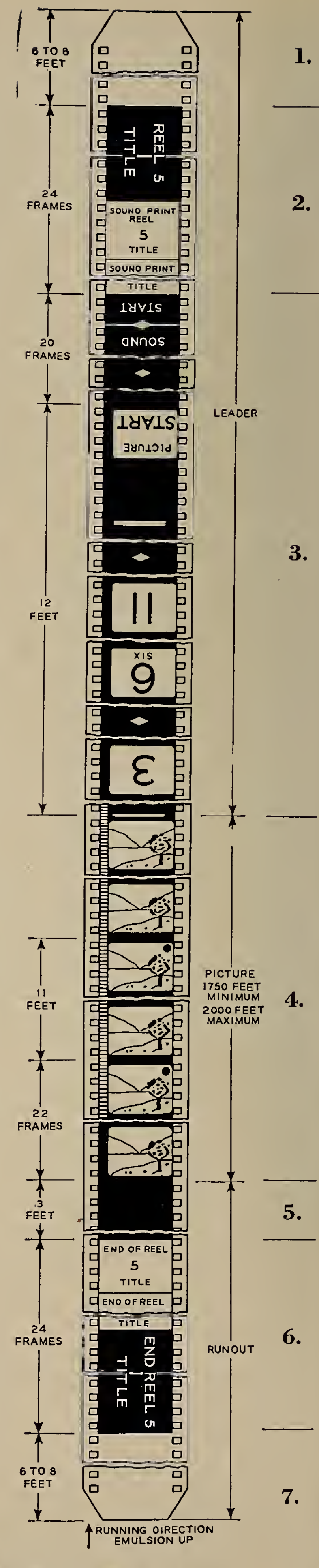
6.1 The identification tail leader shall contain 24 frames as specified below:

(a) 18 frames on each of which are plainly printed in black letters on white background: (a) end of reel, (b) reel number (Arabic nnmeral not less than ¼ of frame height), and (c) picture title.

(b) 6 frames on which are plainly printed, lengthwise with the film, in white letters on black background: (a) end of reel, and (b) picture title.

7. Protective Tail Leader

7.1 The protective tail leader shall be the same as the protective head leader.



* To obtain the transparent outline, the use of a serrated die has been recommended. However, the following alternate method may be used: Insert in the base side of the cue mark hole in the negative a skewer of hard rubber or hard wood which has been dipped in coding ink, and rotate the skewer slightly in the film in order that the ink will form a thin ring around the edge of the hole. Only a very small amount of ink is necessary.

Screen Brightness for 35-mm Motion Pictures (Z22.39–1944)

1. Screen Brightness

1.1 The brightness at the center of a screen for viewing 35-mm motion pictures shall be 10^{+4}_{-1} foot-lamberts (9 to 14 foot-lamberts) when the projector is running with no film in the gate.

[CONTINUED ON PAGE 8]


MIGHTY "90"
75-130 Ampere
High Intensity
for screen widths more than 24 feet.
MOGUL
45-70 Ampere
High Intensity
for screen widths up to 24 feet.
NOW CELEBRATING
THE 30TH ANNIVERSARY OF
THE Strong ELECTRIC CORPORATION
TOLEDO 2, OHIO
THE WORLD'S LARGEST MANUFACTURER OF PROJECTION ARC LAMPS
More dealers sell, and more theatres buy Strong-made lamps than any other kind.
As the only lamps produced complete within one factory, Strong lamps can be engineered to obtain the highest efficiencies ever attained.
PORTABLE
18 Ampere
Low Intensity
for screen widths up to 12 feet.
UTILITY
46 Ampere
High Intensity
for screen widths up to 20 feet.
JUNIOR HIGH
30 Ampere
High Intensity
for 16-mm projection on screens up to 16 feet wide.
UTILITY
One-Kilowatt 40 Ampere
High Intensity
for screen widths up to 18 feet.
RECTIFIERS
Strong also produces a line of dependable rectifiers which includes one designed especially for use with each lamp. All assure smooth output current, long tube life, low operating temperatures, and flexibility in control.
PRECISION REFLECTORS
for all makes and models of projection arc lamps.
TROUPER
High Intensity
Arc Spotlight.
TROUPERETTE
Incandescent Spotlight.

Dimensions for Projection Rooms and Lenses for Motion Picture Theatres (Z22.28–1946)

1. Projection Lens Height

1.1 The standard height from the floor to the center of the projection lens of a motion picture projector should be 48 inches.

2. Projection Angle

2.1 The projection angle should not exceed 12 degrees.

3. Observation Port

3.1 The observation port should be 12 inches wide and 14 inches high, and the distance from the floor to the bottom of the openings shall be 48 inches. The bottom of the opening should be splayed 15 degrees downward. If the thickness of the projection room wall should exceed 12 inches, each side should be splayed 15 degrees.

4. Projection Lens Mounting

4.1 The projection lens should be so mounted that the light from all parts of the aperture shall traverse an uninterrupted part of the entire surface of the lens.

5. Projection Lens Focal Length

5.1 The focal length of motion picture projection lenses should increase in ¼-inch steps up to 8 inches, and in ½-inch steps from 8 to 9 inches.

6. Projection Objectives, Focal Markings

6.1 Projection objectives should have the equivalent focal length marked thereon in inches, quarters, and halves of an inch, or in decimals, with a plus (+) or minus (—) tolerance not to exceed 1 percent of the designated focal length also marked by proper sign following the figure.

Dimensions for Theatre Projection Screens (Z22.29–1948)

Size No. of Screen	Over-all Width (feet)	Over-all Height (feet)	Minimum Effective Picture Size (feet)	
8	8.00	6.00	7.50	5.50
9	9.00	6.75	8.50	6.25
10	10.00	7.50	9.50	7.00
11	11.00	8.25	10.50	7.75
12	12.00	9.00	11.50	8.50
13	13.00	9.75	12.50	9.25
14	14.00	10.50	13.50	10.00
15	15.00	11.25	14.50	10.75
16	16.00	12.00	15.50	11.50
17	17.00	12.75	16.50	12.25
18	18.00	13.50	17.50	13.00
19	19.00	14.25	18.50	13.75
20	20.00	15.00	19.50	14.50
21	21.00	15.75	20.50	15.25
22	22.00	16.50	21.50	16.00
23	23.00	17.25	22.50	16.75
24	24.00	18.00	23.50	17.50
25	25.00	18.75	24.50	18.25
26	26.00	19.50	25.50	19.00
27	27.00	20.25	26.50	19.75
28	28.00	21.00	27.50	20.50
29	29.00	21.75	28.50	21.25
30	30.00	22.50	29.50	22.00

1. Scope and Purpose

1.1 This standard specifies dimensions for projection screens used for viewing motion pictures.

2. Screen Size

2.1 Sizes of screens shall be in accordance with the table below.

2.2 The over-all size shall be measured from the outer edge of border to the outer edge of opposite border. The ratio of the over-all width to over-all height shall be 4 to 3.

3. Border

3.1 A fabric reinforcing border shall surround the screen. The width of this border shall be from 2.5 to 3 inches.

4. Grommets

4.1 Metal mounting grommets, size No. 3 or No. 4, shall be securely fastened through the fabric border.

4.2 Grommets shall be spaced on 6-inch centers, starting from grommets located at the centers of the four sides of the screen, except that there shall also be a grommet in each corner of the screen. Grommets shall be set in a line parallel to the edge of the screen, with their centers from 1.0 to 1.31 inches inside the outer edge of the border.

5. Selection of Screen Size

5.1 The width of the screen should be not less than 1/6 of the distance from the center of the screen to the most remote seat.

5.2 The distance between the screen and the front row of seats should be not less than 0.87 foot for each foot of screen width.

Theatre Sound Test Film for 35-mm Sound Systems (Z22.60–1948)

1. Scope and Purpose

1.1 This standard describes a film for qualitatively checking and adjusting 35-millimeter motion picture sound reproducers and for judging the acoustical properties of the auditorium in which the sound is reproduced.

2. Test Film

2.1 The film shall have a sound track and accompanying picture. The sound track shall comply with American Standard Sound Record and Scanned Area, Z22.40-1946, and the film stock used shall be cut and perforated in accordance with American Standard Cutting and Perforating Dimensions for 35-Millimeter, Motion Picture Positive Raw Stock, Z22.36-1947, or any subsequent revisions thereof.

2.2 The test film shall contain samples selected from studio feature pictures by an appropriate engineering committee of the Motion Picture Research Council and the Society of Motion Picture Engineers. The following sound samples are typical of those which may be included:

(a) Main title music
(b) Dialogue
(c) Piano
(d) Orchestral music
(e) Vocal music

2.3 The assembled film shall include appropriate samples of typical release-print material intended to provide a qualitative check of such reproducing system characteristics as:

(a) Frequency response
(b) Volume range
(c) System noise
(d) Power-handling capacity
(e) Flutter

2.4 Each film shall be provided with head and tail leaders as specified in American Standard Specifications for 35-Millimeter Sound Motion Picture Release Prints, Z22.55-1947, or any subsequent revision thereof. The main title shall include the issue number of the film so that revised versions, which may be issued periodically to conform to changing studio practices,

(*Continued on Page* 29)

Arclamp Generators

By ROBERT A. MITCHELL

III. Inspection and Trouble-Shooting Chart *

MOTOR-GENERATOR sets should be placed in a dry, well-ventilated room especially prepared for their occupancy. A cellar location is satisfactory if perfectly dry; but it is better to have the set installed in a small room immediately adjoining the projection room in order that the projectionist may observe the set from time to time.

The projection room itself, however, is not the best place for a generator. Some local and state ordinances forbid its installation there. Then, too, many projection rooms—mere booths—are too small to make the invasion of so ponderous a room-mate a welcome event. And the motion picture machines subject the projectionist to all the heat and noise he should be asked to endure. Let the motor-generator, therefore, be banished out of sight and earshot to quarters of its own.

Having determined a suitable location for the machine—together with associated switchboards and ballast rheostats—extreme care should be taken to mount the set *perfectly level* on a suitable bed. As to the bed, manufacturers' instructions will be found most helpful. As a rule, a base of concrete upon which are placed a layer of cork and a layer of planking, each 2 inches thick, will be found satisfactory. Several modern sets are so light and solidly built that they require only bolting of the bedplate to planking, under which a thick layer of cork serves to deaden vibration.

Again the value of adequate ventilation is stressed, even though most generator sets are made to withstand high temperatures. It is desirable that a fan of proper capacity be installed in the generator room and positioned so that it draws cool air in around the generator and exhausts the warm air through an outlet near the ceiling.

Generators Need Little Care

When properly installed and wired up, the motor-generator needs little care beyond periodic cleaning, inspection, lubrication, and replacement of worn brushes. Immediate attention should be given to any defects which may be revealed during actual use or through the periodic inspections.

Generators usually go for many years, operating day in and day out, before the commutator wears to such an extent that it needs truing in a lathe.

* Last of a series of three articles on the development, application and maintenance of generators.

Every projectionist learns by experience that inspections, even when apparently unnecessary, provide advance notice of trouble. But it is also well to remember that really thoughtful inspections by a conscientious, observant projectionist are of much more value than careless, routine once-overs.

INSPECTION SCHEDULE

ONCE A WEEK. Check the bearings. Apply lubricant when necessary, either oil or grease *according to the manufacturer's instructions.* Use dynamo oil, not ordinary oil which may contain acidic substances that corrode bearings. Use hearing grease, not vaseline which melts and runs off.

Where an oil gauge is used with sleeve bearings, fill to line on the gauge when the generator is stopped.

If ball bearings, test the temperature of each bearing by feeling the bearing housings with the hand while the generator is running. (Be careful!) Heating usually indicates a bearing overfilled with grease. Also take note of any unusual vibration which may be felt. Listen to the bearings—clicking sounds indicate a cracked or nicked ball. A "listening rod" or physician's stethoscope are useful for checking the condition of ball bearings.

The bearings of vertical-type motor-generator sets require special care. As a rule, the lower bearing requires twice as much lubrication as the upper. Old-style vertical generators are apt to "roar," hut this noise cannot be helped—it's the nature of the beast. In units where the motor drives the dynamo by means of a belt or through a flexible coupling, both the generator and the motor bearings require an equal amount of care.

Check couplings for misalignment, wear, loose coupling holts, damaged finger-pins, discs, etc. Check belts for condition and tightness. The voltage of belt-driven dynamos can be stepped up, if desired, by placing a slightly larger pulley on the driving motor shaft. The faster the dynamo armature revolves, the higher the output voltage. But there are limits beyond which it would be unsafe to venture.

ONCE A MONTH. Examine commutator, brushes, brush-holders, and brush shunts (pigtails). Rough or scored commutators should be smoothed by judicious use of a commutator stone or with No. 00 sandpaper (*not emery paper!!!*)

The Motiograph 70/140 ampere Hi-Power generator, a modern vertical-type machine designed for use with all simplified high-intensity lamps. Ribbon-wound ballast resistors are placed in the base of the machine where they are efficiently cooled.

wrapped over the butt of a stout stick. Use the plain side of the sandpaper for final polishing, afterwards cleaning the commutator with a lint-free rag. Dress with a trace of vaseline. High mica insulation between commutator bars should be undercut about 1/16 inch below the surface of the bars.

Commutator and Brushes

Inspect commutator for loose bars, tightening the "V" clamping ring if necessary, following the manufacturer's instructions.

Short brushes should be replaced. When renewing brushes, replace all of them, and use only the type and grade specified by the manufacturer. See that the brushes are seated properly on the commutator, that the pigtails are connected tightly, that they do not interfere with the brush rigging, and are not accidentally grounded.

Brush pressure should be checked every time the brushes are replaced or cleaned. About 1½ pounds per square inch of brush surface is correct.** Make sure that the brushes are free to slide in the brush boxes, yet not so loose that they chatter when the machine is in operation. Inspect the interior surfaces of the brush boxes for accumulations of grime and for wear.

Blow all dust and dirt from the generator with a hand bellows. Clean ac-

** To determine pressure required by any brush, multiply the width of the brush face by the length of the face by 1½. Test brush pressure with small spring scale.

cessible parts of armature with a soft rag, *not* cotton waste or other linty material.

ONCE A YEAR. Check air gaps (distance separating armature and field pole-pieces) with feeler gauges, taking readings at top, bottom, and both sides. The gap, measuring from 0.005 to 0.020 inch depending on make and model, should be uniform all the way around. A displaced gap may result in inefficient operation, heating of armature coils, and rubbing of the armature against the field pole-pieces. It is corrected by shimming the bearings or replacing worn bearings.

If the output voltage of the generator falls off for no apparent reason, or fluctuates erratically, check all arc circuits and ballasts for loose connections and possible shorts and grounds. The ballast rheostats need examination about once a year.

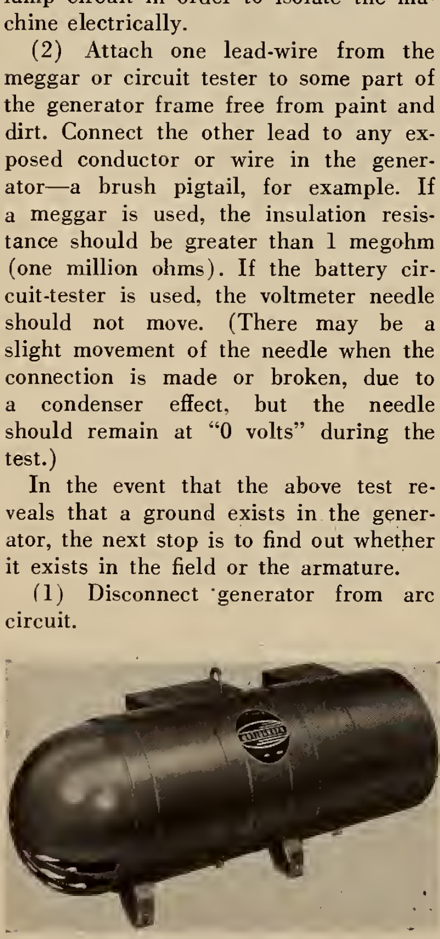
Test the insulation resistance of the generator with either a "meggar" (megohm-meter) or a circuit tester consisting of several dry-cells in series with a DC voltmeter. First make a test of the complete generator in the following way:

(1) Disconnect generator from arc-lamp circuit in order to isolate the machine electrically.

(2) Attach one lead-wire from the meggar or circuit tester to some part of the generator frame free from paint and dirt. Connect the other lead to any exposed conductor or wire in the generator—a brush pigtail, for example. If a meggar is used, the insulation resistance should be greater than 1 megohm (one million ohms). If the battery circuit-tester is used, the voltmeter needle should not move. (There may be a slight movement of the needle when the connection is made or broken, due to a condenser effect, but the needle should remain at "0 volts" during the test.)

In the event that the above test reveals that a ground exists in the generator, the next stop is to find out whether it exists in the field or the armature.

(1) Disconnect generator from arc circuit.



The Motiograph 115/230 ampere Hi-Power generator, a versatile horizontal-type generator set for the larger high-intensity arcs.

(2) Lift all brushes from the commutator so that field and armature coils can be tested separately.

(3) Attach one lead-wire from the circuit tester to the generator frame, and connect the other lead to a brush pigtail. Repeat the test by connecting the tester lead to another brush lug. This will test the brush rigging. the field coils, and the field rheostat with associated wiring.

(4) Connect one tester lead to the generator shaft, and connect the other to a length of fine bare copper wire wound several times around the commutator so as to contact all of the bars. This will test the armature alone.

(5) When the generator "shunt" field is magnetized by a separate exciting dynamo, the exciting circuit with its dynamo, field resistors, control rheostat, etc. should be tested separately.

A complete overhaul of the generator is in order if leaks due to faulty insulation are discovered. To neglect so serious a defect is to invite complete breakdown of the generator.

At least once a year drain old oil from the wells of sleeve bearings. Flush the bearings, first with white kerosene, then with dynamo oil. Refill with acid-free mineral oil of the grade recommended by the manufacturer of the machine.

Check end-play of horizontal sleeve-bearing generators, allowing sufficient play (about 3/16 inch) to permit the armature to "float" in the magnetic field, thus maintaining the electrical efficiency of the machine and minimizing grooving of the commutator.

EVERY TWO YEARS. Dismantle the generator and clean it thoroughly. Check bearings for wear. See that all windings are tight.

Ball bearings should be washed with carbon tetrachloride (poisonous!) or naphtha (inflammable!) and repacked with fresh grease. *Only the recommended ball-bearing grease should be used.* Clean out grease cups and bearing housings, and fill the bearings *only one-half full* of grease. Use no more than this, as overgreasing causes overheating with extra wear and tear on the generator and driving motor.

Trouble-Shooting Chart for Generators

This chart is concerned only with the dynamo component of motor-generator sets. For a DC motor chart refer to IP for January 1951, p. 6. For 3-phase AC motors (the usual type) see IP for February 1951, p. 16. The following chart may be used to shoot both HI and LI direct-current generators of the multiple-arc type.

1. BEARINGS TOO HOT

Trouble: Bearing dry. *Cause:* Insufficient lubrication or wrong type of lubricant used. *Remedy:* Clean bearings and refill with fresh oil or grease of the type recommended by the manufacturer of the motor-generator set.

Trouble: Ball Bearing overfilled. *Cause:* Careless or too frequent lubrication. *Remedy:* Clean out bearings and housings, and repack bearings by filling them no more than half full of ball-bearing grease.

Trouble: Bearing dirty. *Cause:* Dust or dirt in oil or grease. *Remedy:* Clean out oil reservoir or grease cups, flush out the bearings with carbon tetrachloride, naphtha or kerosene, and refill with proper lubricant.

Trouble: Tight bearing. *Cause:* Insufficient lubrication, or undersize bearing if bearing is a replacement. *Remedy:* Provide lubrication. Polish shaft with fine emery paper, or replace bearing.

Trouble: Bearing binding. *Cause:* Shaft "sprung," or motor out of line with generator in 4-bearing units. *Remedy:* "True" the shaft in a lathe, replace armature if shaft is badly bent, renew bearings, realign motor with generator.

Trouble: Loose bearing. *Cause:* Vibration and wear. *Remedy:* Tighten screws holding bearing. Replace worn bearing. Correct faulty supporting base upon which the machine rests.

2. ENTIRE FRAME TOO HOT

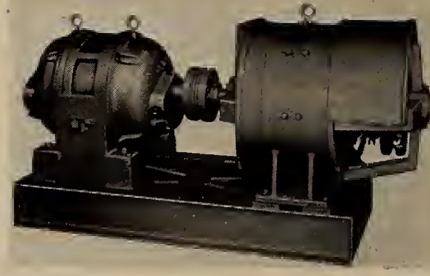
Trouble: Transference of heat from bearings or armature. *Causes and Remedies:* See Causes and Remedies under 1 and 3.

Trouble: Transference of heat from motor. *Causes and Remedies:* See the motor trouble-shooting charts previously referred to. (IP for January and February, 1951.)

Trouble: Transference of heat from field coils. *Causes:* Short-circuits in arc-lamp circuit, shorted coils in generator. *Remedy:* Correct grounds or shorts in arc circuit to decrease load on series field, remedy ballast rheostats which may be shorted or not of sufficient ohmic value. Test shunt field with 45-volt B battery, replacing coils which do not exert a magnetic pull on a screwdriver. (When making this test for shorted field coils, be sure that polarity is correct—positive terminal of battery to positive terminal of field coils,—else residual magnetism of the electromagnets may be reversed, giving rise to further trouble. See under Item 9.)

3. ARMATURE TOO HOT

Trouble: Circuit overload. *Cause:* Shorts



Hertner Transverter motor-generator set, Type CP 200/300.

in arc wiring, ballast resistances shorted, generator not of sufficient capacity to handle the projection arcs for prolonged periods of time. *Remedy:* Correct electrical defects in external circuit, and make sure that the generator is big enough to deliver proper arc current when both arcs are burning at the same time.

Trouble: Armature out of center between poles. *Cause:* Worn bearings. *Remedy:* Replace bearings.

Trouble: Moisture in coils. *Cause:* Water dripping onto the generator, or operating in a damp place. *Remedy:* Dry out by running for several hours with no load. Move the machine to a drier location.

4. SPARKING OF BRUSHES

Trouble: Brushes not properly set with regard to the field winding. *Cause:* Misadjustment of the brush rockers, or yoke shifted to one side of the commutator "neutral point" which prevails under normal load. *Remedy:* Check the brush rockers and replace all defective rigging. Set the brush yoke so that the punch mark on yoke and frame are exactly opposite each other. If this measure does not decrease sparking, determine by experiment the position of least sparking when one arc is burning normally, set the yoke at that point, and write to the manufacturer for further instructions anent brush setting.

Trouble: Brushes cover too many commutator bars. *Cause:* Brushes too thick. *Remedy:* Use brushes of proper thickness. Replace brush-holders if they show signs of wear.

Trouble: Brushes too short. *Cause:* Wear. *Remedy:* Put in a new set of brushes.

Trouble: Poor contact between brush and commutator. *Cause:* Oil or dirt on commutator. Grit in brush. *Remedy:* Remove dirt from slots between the copper bars by means of a pointed stick, wipe commutator with a clean rag, then dress it with a trace of vaseline applied to a cloth pad. Remove dirt and oil from the brushes with carbon tetrachloride. (Avoid breathing the fumes of this volatile poison.) If brushes contain grit, replace with brushes of better quality.

Trouble: Rough or uneven commutator. *Cause:* Vibration, different quality of bars, and uneven ridges where brushes do not wear the commutator. *Remedy:* If the trouble is slight, the roughness may be removed with a commutator stone or 00 sandpaper (NOT emery paper). Otherwise the commutator should be trued in a lathe.

Trouble: High, low, or loose bars. *Cause:* Clamping cone (V ring) loose. Commutator mishandled. *Remedy:* Press the high bars back into place, raise the low bars, carefully tighten V-ring locknut or set-screws, and lastly, true the commutator in a lathe, undercut the mica, and dress with trace of vaseline.

Trouble: High mica. *Cause:* Commutator wear. (Copper wears down more rapidly than mica. When undercut, as it should be, the mica does not wear down at all.) *Remedy:* With a sharp steel tool undercut the mica about 1/16 inch below the surface level of the copper bars. Chamfer the edges of the copper bars with a V tool to remove burrs, wipe free of dust, and dress the commutator.

Trouble: Excessive current. *Cause:* Load too great for generator. *Remedy:* If there are no leaks or grounds in the arc-lamp circuit, or short-circuits in the generator shunt field, obtain a generator suitable for the carbon trim in use.

Trouble: Grounds in armature or commutator. *Cause:* Defective insulation. *Remedy:* Remove ground if possible or, if not, cut out the grounded armature coil and bridge grounded commutator bar. (The grounded coil should be rewound, or the armature replaced, at the earliest opportunity. Note, however, that although grounded armature coils may be cut out and bridged over in an emergency, shorted, grounded, or open field coils must never be bridged.)

Trouble: Commutator bars short-circuited; mica worn or chipped away, causing deep pits between bars. *Cause:* Copper or carbon dust between commutator bars, or melted solder from leads flowing in between bars. *Remedy:* Remove foreign matter from the slots between the bars, and paint the exposed mica insulation with glossy red enamel of the iron-oxide or synthetic type. Use a fine, pointed camelhair brush for this purpose.

5. BRUSHES SING

Trouble: Brush pressure too great. *Cause:* Brush-holder springs not properly adjusted. *Remedy:* Decrease brush tension to the amount recommended by the manufacturer.

Trouble: Brushes of the wrong type used. *Cause:* Brushes probably too hard. *Remedy:* Use brushes recommended by the manufacturer of the generator. Lacking this information, try a softer grade of graphite brush to eliminate singing.

Trouble: Dirty commutator. *Cause:* Improper dressing of commutator, dust and dirt from air, over-lubrication of generator, loss of copper-oxide film. *Remedy:* Clean the commutator, dress with trace of vaseline, wipe off excess from commutator. (A properly dressed commutator will have a thin chocolate-brown film of copper oxide on its polished surface. Once established, this "tarnish" should not be removed. Trouble has frequently been experienced with motors and generators in aircraft flying at high altitudes because of insufficient atmospheric oxygen. Just why this brown oxide film is necessary for satisfactory commutation is anybody's guess.)

6. BRUSHES CHATTER

Trouble: High bars. *Cause:* The cone or V ring holding bars has become loose. *Remedy:* Carefully drive high bars back into place and tighten cone at end of commutator. Smooth commutator with a stone or true in a lathe. Undercut the mica to a depth of 1/16 inch, chamfer commutator bars if edges are burred, clean and dress.

Trouble: Low bars. *Cause:* Wearing away due to soft bars. *Remedy:* Loosen cone and lift low bars. If mica insulation of cone is cut through, replace to avoid short-circuiting of commutator. True commutator and dress.

Trouble: High mica. *Cause and Remedy:* See under Symptom 4.

Trouble: Loose bars. *Cause:* Cone or V ring loose. *Remedy:* Even up bars and tighten cone. As a safeguard, test commutator for grounds with any circuit-testing device. Finally, true the commutator, undercut the

(*Continued on Page* 30)

Pacent, Sound Pioneer, Passes

Pioneer manufacturer of talking picture equipment and early experimenter in radio, Louis Pacent, head of Pacent Engineering Corp. died suddenly last month at the age of 58.

One of the first of all "independent" theatre sound equipments was Pacent's. This was when sound still came to the theatre on disc rather than on a track. Pacent's turntable was the first in America to be pedestalled at a height convenient to the projectionist so the latter could change records and adjust the needle without stooping almost to the floor, as other equipments then required. During the depression Pacent equipment disappeared from the theatre market, but his company continued to manufacture apparatus to specification for Western Electric Co., RCA, General Electric and Westinghouse.

Louis Pacent's interest in radio and experiments with it began in 1909, when he built himself a "ham" station at the ripe age of 15. His experiments with talking pictures date back to the 1920's, and he was consultant to Warner Brothers during their development of apparatus leading up to "The Jazz Singer."

Surviving are Mrs. Pacent and two sons, Homer Cosmo and Louis Gerard, Jr.

TESMA Meets Nov. 15-19

Theatre Equipment and Supply Manufacturers Association and Theatre Equipment Dealers Association will hold their annual joint trade show and convention in Chicago's Hotel Morrison on November 15th to 19th, jointly with Allied States Association of Motion Picture Exhibitors.

Heads of the three organizations: Bob Hoff of Tesma, Ray G. Colvin of Teda, and Jack Kirsch of Allied, met in Chicago last month to organize and announce the details. Exhibits open 2:00 p.m. Saturday the 15th; the Tesma-Teda luncheon is slated for noon, Sunday the 16th; the Teda party is set for 8:00 p.m. Tuesday, and the gathering will conclude on a high note with the cocktail party and banquet on Wednesday evening. Plans for exhibition of theatre equipment items will be announced by Tesma beginning early in June.

Kodak Sales Steady

Eastman Kodak Co.'s estimated consolidated sales for the first quarter of 1952 totalled approximately $119 million as compared with $120 million for the same period of 1951, Thomas J. Hargrave, president, told shareholders at their annual meeting at the end of April. Eastman Kodak now has 49,600 employes, he revealed. Shareholders total nearly 70,000 of whom 3,000 are employes.

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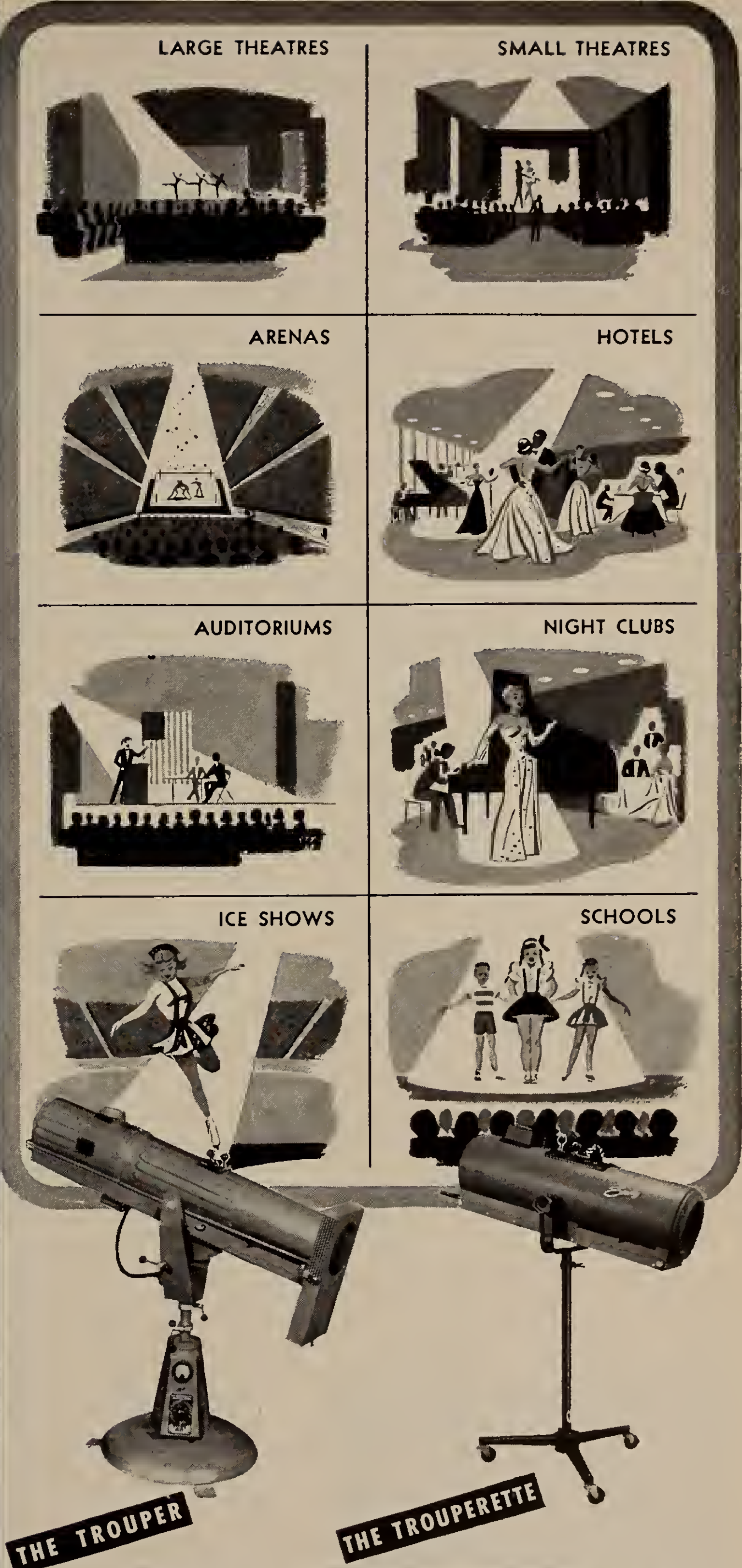

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SMPTE Surveys Technical Aids to Theatres

By HENRY B. SELLWOOD

SMPTE members convening in Chicago last month sent their engineering imaginations forward into a future of stereoprojection and television, and nostalgically backward to a past of "One Minute Please to Change Pictures."

The Society of Motion Picture and Television Engineers met in Chicago's Drake Hotel. It was their 71st semi-annual convention; and lightened, as usual, with a luncheon, cocktail hour, banquet, dance and entertainment. These diversions were near necessities, for the technical schedule was very heavy.

A total of 52 papers were presented, including one so very intricate that engineers present asked for further elaboration in the form of a written report.

"Today . . . an interest in engineering is developing quite generally among motion picture people who have not had technical training or experience," Peter Mole, President of the Society, said in welcoming the members and guests. "Evidence appears in many places —in plans of motion picture interests to appear before the Federal Communications Commission in the matter of Theatre Television—in current efforts to produce stereoscopic motion pictures for theatre release—in the first steps toward extending the field of view of theatre patrons through changes in screen design or illumination of the surrounding area—and in widespread introduction of new or enlarged facilities for release printing in color."

President Mole did not anticipate that any one of these developments by itself would prove the salvation of the box office; he pointed to them as "clear evidence of a trend toward technical improvement."

Nathan Halpern, President of Theatre Network Television, Inc., predicted that in time every motion picture theatre would be equipped with TV as a matter of course. At present 75 theatres in 37 cities from coast to coast are so equipped, he estimated. Theatre TV will "erupt suddenly," he believes.

Peter Mole (left), president of the SMPTE and president of Mole-Richardson Co.; Dr. W. R. G. Baker (center), chairman of the National Television System Committee of the Radio-Television Manufacturers Association and vice-president of General Electric Co., and Herbert Barnett, executive vice president of General Precision Labs., gather to discuss color TV field tests at the recent convention.

James Frank, Jr., Deputy Director of the Motion Picture and Photographic Products Division of the National Production Authority, reported probable easement of materials shortages in most commodities. One reason, according to Frank, is increased production; steel output is up 10 percent since the Korean shooting started and will continue to rise to 120 million tons per year. Aluminum production will eventually reach double the pre-Korean output. But copper and nickel-steel remain in short supply.

Dr. W. R. G. Baker, vice president and general manager of General Electric Company's Electronics Division, reported rapid progress by the National Television System Committee in collecting field test data bearing on problems of color television. These studies were concerned with making the fullest possible use of available TV frequencies. "The spectrum," he said, "is a national resource. To use it inefficiently is the same as wasting any other national resource."

Conspicuous at the Convention, in addition to the emphasis on television and on stereoprojection, was the new importance of magnetic recording on film. Although reports to the Convention did not indicate any present use of magnetic recording on 35-mm film, but only on 16-mm, the interest in the 16-mm field is intense, and a number of equipments were demonstrated. Three varieties of 16-mm sound track are now available; optical, magnetic and magneto-optical. The last is a double track, one-half magnetic and the other optical, lying side by side along the film, each of only half the normal width. The Society is undertaking a study of these recently-developed practices with a view to standardization.

Stereo and TV

A device, contrivance, invention or whatever one wants to call it that applies both to three-dimensional projection and also to full-color television was analyzed mathematically by Sam H. Kaplan, consultant, of Chicago. This is the "parallax barrier." Physically it consists of an arrangement of parallel wires, or slits, or rows of lenses. "A parallax barrier may be defined as a masking device which when interposed between an object space and an image space, prevents any given part of the image space from being sighted from any but a given set of preferred directions," the speaker explained.

If a barrier of this type is arranged in front of a motion picture screen each of the two eyes of the observer views the screen through a different set of slits and therefore sees a different image. When each eye sees a different image, the conditions necessary for three-dimensional viewing have been met. Practical difficulties include arranging and spacing these slits so they apply to all seats in a theatre and not just to a few; and also in calculating such generous provisions that patrons can move their heads without losing sight of the picture.

The geometrical optics of these requirements were analyzed in considerable detail, the possibilities and difficulties were computed.

Credit for the paralax barrier was given to "Berthier of France who suggested it in 1896. Frederick E. Ives applied it first to produce stereoscopic still pictures in 1904. . . . A barrier with a multitude of elements behind each barrier aperture, instead of only two, was invented by C. W. Kanolt, who obtained U. S. Patent No. 1,260,682 on March 26, 1918. . . . A radial type non-parallel type barrier was invented by B. T. Ivanoff (who has used it to show three-dimensional motion pictures in Russia). The substitution of lenses as an alternate to mechanical blocking barriers was first proposed by Gabriel Lippmann in France in 1908."

Purpose of the lenses is to compensate for light loss. "One defect in the practical application of parallax barriers is the light loss introduced by the barrier itself. This limitation can be minimized by replacing each aperture or slit by a corresponding spherical or cylindrical lens. . . . Replacing the aperture by a larger size lens can theoretically

George Colburn (left), head of George W. Colburn Labs.; William C. DeVry, president of DeVry Corp., and Oscar F. Neu, president of Neumade Products Corp., prepare to enact their respective roles as amateur entertainers at the SMPTE banquet.

cut the barrier loss to zero. Instead of acting as a mechanical barrier, the lenses refract or converge the rays to the proper position on the image surface. In stereoscopic picture processes modern practice calls for lens elements molded into the film base."

Where the principle of parallax barrier is used for color TV the barrier is located inside the TV picture tube "as a positive means of insuring that portions of a mosaic screen are subjected to bombardment by a predetermined electron beam." This invention is credited to Dr. Warner Fleshig and first revealed in German patent No. 736,575 applied for in 1938. Since it "deals with electron rays instead of light, electron lenses can be used . . . the apertures themselves can act as (electron) lenses. . . . A large number of tricolor picture tubes are being built on this principle. Up to the present the application of the parallax barrier principle in a cathode-ray tube represents the most promising solution for all-electronic color television."

"One Minute Please While . . ."

"One Minute Please to Change Pictures" was the smaller of two slogans displayed by a very, *very* old-time slide projected by Arthur J. Hatch of Strong Electric Corporation in the course of demonstrating the effectiveness of the very modern Strong high intensity slide projector. The projector, which can brilliantly spread the image of a 3-inch slide across a 35-foot screen, not only invited the assembled engineers to wait one minute while the operator changed reels, but also to "Chew White's Yucatan Gum"—"Please Remain Seated, the show is not over" (this one illustrated by a tinted view of shrimp boats or some kind of sailboats a-comin'), and—"To vote AGAINST PROHIBITION, mark ballot thus:" (under which is shown the facsimile of a ballot and the date: November 6th, 1917). And last, fully illustrated with pickaninnies in brilliant red ballet skirts: "We'd rather be bright than be President, let the GOLD DUST TWINS do your work." According to the recollections of the oldest old timers consulted none of these slides could have been shown in a theatre later than World War I and most probably go back to about 1912 or 1914; to a time when such brilliance of slide projection as was obtained from the Strong unit represented only a dream as improbable as "pictures by wireless."

New Screens

A stereoprojection screen system for three-dimensional viewing and the recently-developed Schlanger-RCA Synchro-Screen were described at the Tuesday morning session.

Strong Electric Corp's high-intensity slide projector, shown here, amused assembled engineers by flashing an old "One Minute Please to Change Pictures" slide of nickelodeon vintage. Same projector was used throughout the convention for the more serious purpose of presenting slides with which engineers illustrated their technical papers.

The Synchro-Screen (*see IP for January*, 1952, *page* 16, *and for February*, 1952, *page* 18) was described in a paper prepared by Benjamin Schlanger, his associate William A. Hoffberg, and Charles R. Underhill, Jr., of RCA, and delivered by R. H. Heacock of RCA. The same screen was on view at Eitel's (formerly RKO's) Palace Theatre in Chicago, with "Singing in the Rain," where registrants at the SMPTE Convention were admitted without charge on presenting convention identification cards.

A "Cyclostereoscope" screen system for three-dimensional viewing without viewing spectacles was described in a paper prepared by Pierre Vanet, of Paris and W. Wheeler Jennings of Chicago, and read by Mr. Jennings. Essential feature of the system is a huge, rotating, cone-shaped grill which surrounds the screen. The grill is built of 108 aluminum bars that slope inward 20°. This structure revolves; the screen is viewed through the spaces that separate the aluminum bars. With suitable film, within lateral viewing angles of 40° and within viewing distances between 2½ and 6 times the screen width, stereoscopic effect is produced, it was claimed.

Projectionists Solved the Problem

". . . projectionists at the M. G. M. laboratory, who had been informed of our problem and had built a model of their own . . . solved the excess heat problem," said Harry Brueggemann of Cinecolor Corporation in the course of his paper, "Continuous Arc Projector Light Meter." According to Cinecolor's experience, it was explained, standard arc lamps may vary in light output by as much as 20 percent in 10 minutes. "This variation, of which the projectionist has no indication . . . would probably never be noticed in a theatre" but it is far too much for the studio worker who is attempting to blend the intensities of successive scenes in a pleasing manner. An automatic compensation, based on a photo-electrically controlled thyratron which in turn governs the carbon feed motor, was considered and rejected as too expensive. "The only system which seemed feasible would make use of a photovoltaic cell type meter, so arranged as to keep the projectionist continually informed as to the light output . . ."

A Weston Photronic cell type RR, and a 0-20 microammeter were used, the latter mounted "just below the viewing port, so that the projectionist can see the screen and the meter at the same time." To supply energy to the photronic cell a piece of optically flat, unsilvered glass was mounted in the mechanism, in the light path, at an angle of 45°. Approximately 90 percent of the light continued along the usual path; some 10 percent was deflected at right angles. This loss was readily compensated by trimming the arc.

Metering Under Difficulties

The difficulty solved by the M. G. M. projectionists lay in the fact that the 10 percent of energy, both light and heat, amounted to too much for the photronic cell. A dense green glass placed ahead of the cell "cut down the light to a workable level" but the heat came through and raised the temperature of the cell too high for stability, so an Aklo heat glass was added. This promptly cracked. Thus it was evident that another means of reducing the heat was necessary. Ventilation slots were cut into the casting holding the cell, and this helped some, but the Aklo glass still would not stand up.

"At this point the projectionists at the M. G. M. laboratory . . . thought of replacing the dense glass filter by a sheet of brass shim stock with pinholes." Further, whereas the first Cinecolor model had used a bakelite mounting, the M. G. M. projection staff designed a "metal encased cell for conduction cooling. The M. G. M. modifications resulted in a cell mounting which was only slightly warm to the touch, even after many hours of continuous operation."

Credit for the ultimate perfection of the continuous arc light meter was given by the speaker to Chief Projectionist James Phillips of Cinecolor; and Chief Projectionist Merle Chamberlain, and Projection Engineer Clayton C. Troxel, Jr., of M. G. M.

Problems of "Motion Picture Theatre Installations Aboard Naval Vessels" and especially the smaller ones introduced

(*Continued on Page* 23)

IN THE
SPOTLIGHT

AN ESTIMATED 1,000 representatives of IA Local Unions throughout the United States and Canada gathered in the ballroom of the St. George Hotel, Brooklyn, N. Y., on April 19 last to honor General Secretary-Treasurer William P. Raoul at a testimonial dinner sponsored by the 10th District.

Since the honor guest's home city is Atlanta, Ga., the members of Brooklyn Stagehands Local 4 built a facade of a pre-bellum Southern mansion behind the double-deck dais, and a tremendous burst of applause followed from all tables in the ballroom when the band struck up "Dixie." The widespread geographic origins of the guests were made evident by the applause that followed, in each case from a different set of tables, when the band that participated in the festivities played a succession of songs popularly identified with specific states and regions.

A diamond ring bearing the IA emblem was presented to Secretary Raoul on behalf of the Local Unions comprising the 10th District.

IA President Richard F. Walsh; J. C. McDowell, secretary of New York Local 1; Thomas Murtha, business representative, Brooklyn Local 4; and William Collins, AF of L regional director, were among the principal speakers. The speakers stressed Raoul's services in improving wages and conditions of employment and in promoting teamwork among Locals of all areas. Secretary Raoul, in turn, emphasized the cooperation that Locals had extended to him in his work and stressed his philosophy that a labor leader should be "always the servant . . . of those he represents."

Murtha was toastmaster and chairman of the arrangements committee. Among the industry leaders seated on the dais were Maj. L. E. Thompson of RKO; Joseph Vogel, Loew's, Inc.; Frank Phelps, Warner Bros.; Gen. Lyman Munson, NBC; Russell V. Downing, Radio City Music Hall; Martin T. Lacey, president and James C. Quinn, secretary-treasurer, Central Trades and Labor Council of Greater New York.

Also seated on the dais and representing IA Locals from all parts of the country were, among others, Albert F. Ryde, L. 233, Buffalo, N. Y.; Don Rood, L. 128, Utica, N. Y.; IA Rep. John Francavilla, L. 702, New York City; IA Rep. Eddie Miller, L. 279, Houston, Tex.; IA Trustees William C. Scanlan, L. 73, Lynn, Mass., R. E. Morris, L. 142, Mobile, Ala., and George W. Brayfield, L. 230, Denver, Colo.

General Secretary-Treasurer William P. Raoul (center) being congratulated by IA President Richard F. Walsh (right) and Toastmaster Thomas Murtha (left) at the recent 10th District testimonial dinner given in his honor.

Virtually all top IA executives were present, including Harland Holmden, L. 160, Cleveland, Ohio; James J. Brennan, L. 1, New York City; Roger M. Kennedy, L. 199, Detroit, Mich.; Felix D. Snow, L. 31, Kansas City, Mo.; Carl G. Cooper, L. 33, Los Angeles; Harry Abbott, L. 307, Philadelphia; Orin M. Jacobson, L. 175, Tacoma, Wash.; John Spearing, L. 511, Jacksonville, Fla.; Maynard Baird, L. 405, Knoxville, Tenn., and Larry Katz, L. 488, Harrisburg, Penna. Rev. Joseph Kelly, of St. Peters College, N. J., pronounced the invocation.

• Applications are now being received by the Committee on Education of the Massachusetts Federation of Labor for two fellowships, which include a 13-week course at Harvard University, Cambridge, Mass. The course will begin September 1952 and will include, among other subjects, a history of the American labor movement, problems in labor relations, arbitration and conciliation, pension plans, negotiation and wage incentives. No specific education qualifications are required and applications will be received until June 30.

• Ken Caldwell, member of Buffalo Local 233 and projectionist at Dipson's Bailey Theatre, announced the debut several weeks ago of the Caldwell Halo Screen. Theatre audiences responded favorably to the new screen, reports Caldwell, and he is very optimistic about its reception throughout the country.

• The AF of L's Union Industries Show will hold its 1952 exposition at Mechanics Hall, Boston, Mass., May 17-24. This is the seventh show in a series which began in Cincinnati in 1938. It is expected that every AF of L craft will be represented in this exposition, which is designed to encourage better relations between AF of L unions and their respective employer firms.

• Los Angeles Local 150 recently signed 5-year pacts with Fox West Coast, Warner Brothers, RKO, United Artists, and Paramount. The contracts call for a sliding scale of increases beginning with a 12c per hour increase, retroactive to July 1, 1951 and running to June 30, 1952; from July 1, 1952 to June 30, 1954,

Guest of honor at the recent 10th District testimonial dinner, IA General Secretary-Treasurer William P. Raoul (seated, second from left), is shown here with executive board members of the District. Seated, left to right: Albert F. Ryde, bus. rep. L. 233, Buffalo; Raoul; Thomas Murtha, bus. rep. L. 4, Brooklyn; J. C. McDowell, sec. L. 1, New York City. Standing, left to right: H. Paul Shay, L. 289, Elmira, and 10th District sec.; Donald R. Rood, L. 128, Utica; M. J. Mungoven, bus. rep. L. 25, Rochester; IA Rep. John J. Francavilla, L. 702, New York City, 10th District executive board member Nathan Storch, L. 366, Westchester County, was unable to attend the dinner because of illness.

each man will receive an additional 15c per hour increase; and from July 1, 1954 to June 30, 1956, another 12c per hour increase will become effective. In addition to the wage increases, the new contracts include new benefits in the vacation clause. Negotiations with the drive-in theatres and the independents are still pending.

• Detroit Local 199 lost one of its 40-year members in the death last month of Charles Barnett, 58, projectionist at the Broadway-Capitol Theatre. Barnett succumbed to a heart attack, a disease which has become the number one killer in our country today.

• Among the many recent out-of-town visitors to the offices of IP were: Eddie Miller, business representative, and "Bumps" Googler, Local 279, Houston, Tex.; William B. Keeler, business representative, and John Dennis, L. 407, San Antonio, Tex.; Harvey D. Hill, Sr., business representative, Local 249, Dallas, Tex.; Pat Travers, L. 173, Toronto, Ont.

• Local 586, Columbus, Norfolk, Grand Island, Hastings, and York, Nebr., held a Silver Jubilee dinner party last month in celebration of its 25th anniversary. In addition to the members, a number of top-ranking IA officials attended the party. IA President Richard F. Walsh and Leo Tews, business representative of Local 586, were presented with traveling clocks. Tews, incidentally, is the only remaining charter member of the Local. Gifts of cuff links and tie clasps were presented to Roy Brewer, former president of Local 586 and now IA West Coast representative, and to Felix D. Snow, IA 5th vice-president.

• Employes of the Allen B. Dumont Laboratories (N. Y.; N. J.; Conn.; Penna.; D.C.) engaged in the storing of motion picture film unanimously elected New York Motion Picture Film Editors Local 771, IATSE, as their bargaining agent. This election was certified by the NLRB.

• Chester Demaree, business representative for Local 163, Louisville, Ky., reports the signing of new contracts with the drive-in theatres in the Local's jurisdiction, giving the projectionists an increase of $10 per week. This increase, which is subject to the approval of the Wage Stabilization Board, is retroactive to January first last.

• Members of Chicago Local 110 earned over $50,000 last year operating 16-mm equipment in and around the Chicago area, revealed Clarence Jalas, secretary of the Local. Officials of Local 110 began taking an active interest in the matter of 16-mm showings several years ago, when it became evident that renters of such equipment in the Windy City failed to hire union members to operate it, as they had promised to do. This situation was remedied, however, when Gene Atkinson, business representative of 110, and Jalas took an active interest in the matter, and for the past few years the 16-mm showings have been the work of 110's members. These showings are mostly at hotels, in connection with sales meetings and other conventions.

• In his April 25th column for *The Unionist*, the official organ of the Nebraska State Federation of Labor, Clyde Cooley, secretary of IA Local 343, Omaha, Nebr., pays tribute to the heroic efforts of the people living in flood-threatened Council Bluffs and nearby towns in trying to save their homes and the homes of their neighbors from the ravages of the rampant Missouri River. All theatres in the threatened areas closed and the employes joined the thousands of others whose chief concern was to reinforce the flood walls and to prevent further damage. Although the press throughout the nation mentioned the wonderful work done by the civilian flood workers, very little was said about the magnificent efforts of organized labor in the Missouri Valley flood area in helping to alleviate the sufferings of the stricken people.

Mayor Mulqueen, of Council Bluffs, Iowa, voiced the praise of officials of the inundated towns and cities when he stated "I deeply appreciate the efforts of union members in this emergency. The skilled craftsmen, railroad brotherhood members, and others have helped immensely in this battle against our common enemy. I would like to express the deepest gratitude for the manner in which all of you have faced the problems and for the help which you have given."

• We were glad to learn that James V. Fensore of Local 277, Bridgeport, Conn., and projectionist at Loew's Poli Theatre, is recuperating from his recent indisposition.

• A four-day labor course at the University of Iowa, June 16-19, was recently announced by the Iowa State Federation of Labor. All labor bodies and trade organizations in the state have been invited to send representatives. The enrollment fee of $50 will cover tuition, registration, board and room for the week. Subjects to be discussed include labor history; current labor laws of state and nation; union security; trade unions' public relations; workmen's compensation; unemployment insurance, and vocational rehabilitation. There will also be a one and one-half day conference on wage stabilization and industrial safety.

Rademacher Promoted

A. J. Rademacher has been promoted to assistant operating manager of Altec Service Corp., Operating Manager E. O. Wilschke announces. Rademacher was formerly business manager of the Eastern Division. He has been associated with Altec throughout the company's existence and has won repeated promotions.

Business Is Better

Easter weekend attendance in New York picture houses was the heaviest since 1946, Metropolitan Motion Picture Theatre Association estimated.

IA President Walsh (fifth from right) and Leo Tews, bus. rep. Local 586 (extreme right), hold the traveling clocks presented to them on the occasion of the Local's recent 25th anniversary celebration. Local 586 officials gathered at the festive boards are, left to right: L. Christofferson, treas.; F. L. Kerwood, pres.; O. P. McCurdy, sgt.-at-arms; E. O. Hart, fin.-sec.; F. D. Snow, IA 5th vice-pres., Walsh; C. Krieger, sec.; W. E. Snyder, pres.; F. Driskell, member, exec. board, and Tews.

Inspection, Splicing and Care of Film

These notes are condensed from advisory comment prepared by Eastman Kodak for film exchanges; they apply just as emphatically to theatres.

INVESTIGATION of the general procedure in the inspection and repairing of prints indicates that a considerable portion of initial damage may actually occur in the exchange. Inspections are frequently too rapid to be thorough and the methods employed may easily have a direct bearing on the life of the prints. Splicing, if carelessly done, will frequently result in the films being sent to the theaters in such poor condition as to be unable to withstand ordinary projection and rapid rewinding.

Careful inspection and repairs in the exchange result in better service to the exhibitor, greatly lessening the danger of breaks in the projector. Such breaks may result in additional mutilation, a frequent source of considerable controversy between the theater and the exchange. Any steps which can be taken to eliminate these breaks will reduce replacements and make the film constantly available for service. Longer commercial life means increased earning capacity.

Inspection Methods

Methods of inspection vary in different exchanges. Some inspectors hold the hand below the film (the specified method in some instances), so that the film runs between the thumb and finger, usually through a cloth, cotton glove or in some instances cleansing tissues, to feel for bad splices and cut edges. This is illustrated in Figure 1 and is considered to be the approved method.

In many instances, however, inspectors may hold the film in the closed hand from above, applying pressure with one or more fingers to the underside of the film in order to obtain sufficient tension for snug winding, then upward between the thumb and forefinger for edge checking, as shown in Figure 2. This method permits rubbing of the complete surface of the film, resulting in a considerable amount of emulsion abrasion, particularly if the cloth or glove through which the film is drawn is badly soiled. Cloths used for this purpose are frequently in this condition because they are often used for the purpose of removing oil and dirt from the film. If the cloth is not changed frequently it may soon accumulate enough dirt particles to cause abrasion. Another objection to holding the film in this manner is that it often allows the film to rub directly against the metal top of the work bench, and any such contact should, of course, be avoided.

FIG. 2. Non-recommended method of holding and guiding film during inspection. Use of this method may result in excessive abrasion and, possibly, under dry air conditions, in center splitting or edge breakage (see Fig. 3).

Center Splitting

If inspection is carried out as shown in Figure 2 then the edges of the film are usually forced downward by the pressure of the thumb and finger. Because of this, the film often develops a running kink which may cause cracking or splitting, especially in old prints which have had repeated projection or in prints which have dried out due to storage at low relative humidity. These center breaks (Figure 3) may occur even with newer films under cold, dry, winter conditions if the film is bent or cupped too severely during winding. Occasionally it is found that inspectors tape the fingers of the glove. This practice is undesirable because the tape prevents the operator from ascertaining how much pressure is being applied to the film and reduces his or her sensitivity to faults.

FIG. 1. Recommended method of holding and guiding film during inspection.

For better screen quality, all prints should be properly cleaned when they become dirty or badly oiled, but this should be done by approved methods only. In many cases, prints are run through a dry cloth to remove dirt and oil. This is likely to result in scratching the film owing to accumulation of dirt particles on the cloth, and most of the oil is merely spread over the film rather than removed. This practice is undesirable, particularly with new prints, which are more easily scratched than films which have been run.

Cleaning can best be done by laboratory cleaning machines, with which proper techniques and precautions can be observed.

When prints must be cleaned by hand, this may be done by rewinding the film slowly through a lint-free rayon plush, or a soft cotton cloth pad which has been moistened with film cleaning fluid. The pad can be folded over the film and held in the left hand while the right hand is used to operate the rewind. The operation should be carried out slowly so that the cleaning liquid can evaporate from the film before it is wound into the roll. The pad surface must be changed frequently since a dirty pad will redeposit oil and dirt and may abrade the film.

Cleansing Fluids

The film cleaners used are generally carbon tetrachloride* or dry cleaning solvents. Carbon tetrachloride is highly toxic, while the less toxic dry cleaning solvents are inflammable, so that both must be used with caution. Ample ventilation with fresh air is essential and one should carefully avoid inhaling the fumes of carbon tetrachloride.

The cloth used for cleaning must be selected carefully. Baled rags usually contain many harsh cloths that will scratch and abrade the film and may also contain a great deal of lint. Best of all is a clean, short-nap rayon plush or velvet. Next best is a soft cotton knit fabric, plush, or a soft well-washed cloth.

Poor Rewinding

In rewinding, care should be taken to see that the winding equipment is properly lined up so that the film will feed smoothly and squarely from one reel to the other. In this manner a smooth roll is wound with no protruding edges.

In order to obtain smoothly wound rolls, many inspectors bind one edge of the film against the reel flange during the winding operation as shown in Figure 4. As a matter of fact, rewinds are often deliberately set out of line to give even winding by this method. Moreover, exchange reels are so frequently sprung out of shape, as illustrated in Figure 5, that even winding is almost impossible unless flange binding is employed. This practice is especially bad if there is a sharp point in the rim of the reel (often caused from the jaws of pliers used to remove a reel of film from a tight case). Such sharp point may cut the edge of the film on each turn of the roll. It is not at all uncommon to have only one-half-inch spacing where the flanges of a two-thousand-foot reel are snapped together, or a spacing almost double the width of the film where the flanges are sprung apart. Under these conditions it is essential that the film be guided in some manner during rewinding in order to avoid turns or convolutions with protruding edges. These exposed edges are easily bent over and broken during handling or shipment, as shown in Figure 6, or if the rolls are forced into a shipping case which has become badly dished, such as the one shown in Figure 7.

If the exchange finds it necessary to use defective reels and cases until such time as replacements are received, every effort

FIG. 3. Center break caused by excessive bending or cupping of film during inspection by the non-recommended method shown in Fig. 2.

FIG. 4. Illustrating practice of edge binding print against flange during rewinding to obtain an evenly wound reel of film.

FIG. 5. A badly distorted exchange reel, the kind that damages or ruins film.

* WARNING! Carbon tetrachloride fumes are poisonous; headache and nausea are a first warning, and continued exposure may be fatal. Evaporation of only two teaspoonfuls of carbon tetrachloride into a small unventilated film inspection room is enough to raise the concentration of fumes beyond the safe level. Carbon tetrachloride is dangerous whenever the odor becomes strong enough to be obvious. Ventilation must be good so that a person just entering the room where carbon tetrachloride is being used can barely smell the fumes. If the fumes become stronger, all windows should be opened, the cleaning stopped, and the room emptied until it has been thoroughly ventilated.

FIG. 6. Showing how unevenly wound film may be damaged either during shipment or through being forced into a "dished" case such as is shown in Figure 7.

should be made to restore them to a reasonably usable condition.

Notching Is Harmful

It is common practice to notch the edges of the film when small side nicks or breaks do not warrant immediate splicing. On the subsequent examination however, these notches frequently develop into long tears when caught by the glove or cloth, often resulting in a noticeable break in continuity. Film breaks during projection may also occur in some cases as a result of edge notching. This practice of edge notching is definitely and seriously harmful.

Leaders and Trailers

Protective leader and trailer strips should be kept at full length. Motor winding speeds are frequently so high as to cause the end of the film to whip around (on the projector take-up as well as on a motor-driven rewind) a number of times before the roll is stopped. This can be responsible for considerable loss in footage if the protective leaders or trailers are allowed to become too short.

New Print Mounting

It is important to note that the emulsion surface of newly processed film is more susceptible to abrasion than film which has seen service. Therefore, in mounting new prints just received from the laboratory, care should be taken to avoid contact with the picture area even though cotton gloves or a cloth might be used.

New film should not require cleaning but if it is found necessary to remove lint or dust particles such as might come from the tissue wrappings or cardboard separators, silk plush, slightly dampened with carbon tetrachloride or other film cleaning liquid, should be held very lightly against the film as it is wound. The plush pad surface should be changed frequently and the surface of the film should be checked often for any abrasions which might result from this "dusting" process. Winding should be carried out very slowly to permit complete evaporation of the solvent, otherwise the latter may cause spotting of the film if it is wound into the roll.

If carbon tetrachloride is used the precautions previously noted should be observed in order to prevent toxic effects resulting from undue exposure to the fumes from this chemical.

"Bicycling" Prints

In locations where a shortage of prints exists it is often necessary to circuit them directly from one theater to another. In such cases, release prints frequently suffer considerable damage. There are recorded instances of some prints being exhibited by six or eight theaters before they are returned to the exchange for examination and repair. During this process the print does not have the benefit of exchange inspection and repair.

It is quite possible that some types of damage which occurred during projection or handling by the first few theaters might have been arrested. Instead, further footage is affected. The total damage greatly increased. Circuiting also makes it impossible to identify the theater responsible for the damage in the event that compensation is sought by the exchange.

Splicing

Splicing, whether done in the film labcratories, film exchanges or theaters, has such a direct bearing on the life of film as to call for special and constant attention.

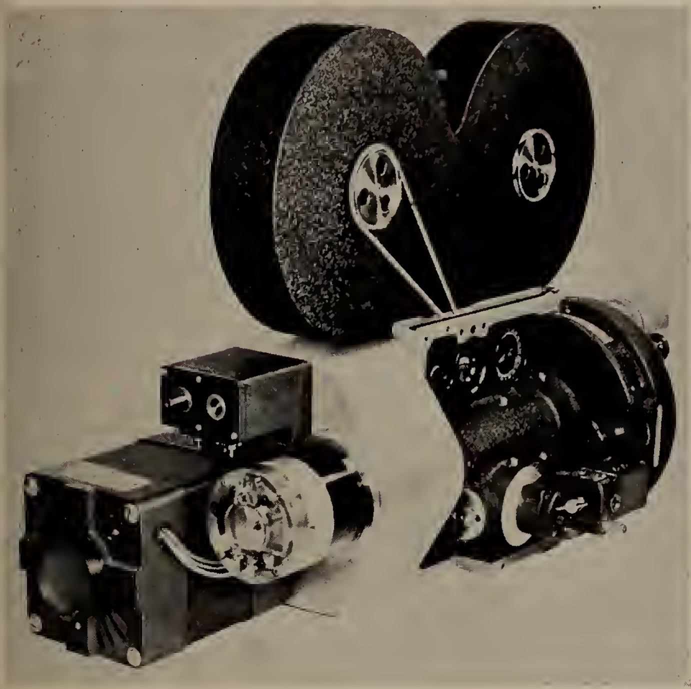
Much film is ruined by poor splicing. Splices that are wide, stiff, buckled or out of line might cause the film to jump the sprockets so that torn perforations or breaks result. Perforations in the vicinity of a splice of this kind are always strained or broken.

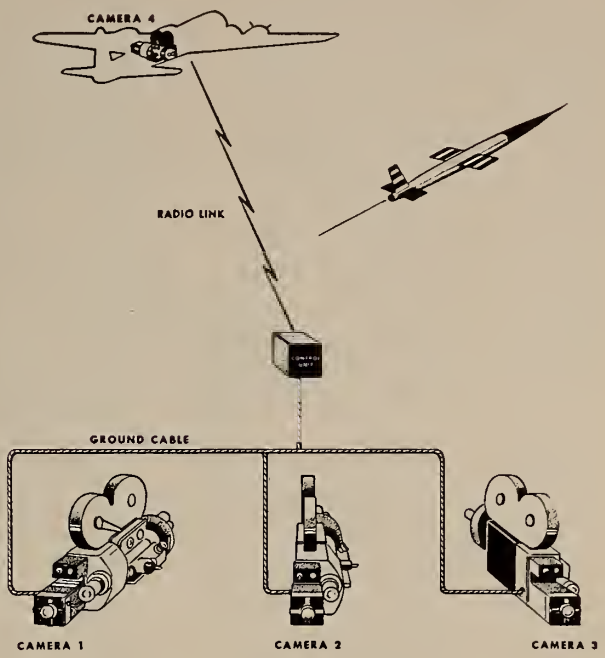
[TO BE CONTINUED]

FIGURE 7

"Dished" or badly bent case. Such cases should be repaired or discarded to prevent damage to film.

NEW MAURER SERVO-SYNC CAMERA DRIVE HOLDS PROMISE FOR THREE-DIMENSIONAL STUDIES





A new system for synchronized motion picture camera operation, providing greatly closer time synchronization than heretofore possible, is announced by J. A. Maurer, Inc., Long Island City, N. Y.

The system, known as the Maurer Servo-Sync Camera Drive System, was designed by Origins, Inc., Saybrook, Conn., and is manufactured by Maurer. It is designed to achieve a long-sought goal in scientific photography—dependable, consistent, and accurate operation of a series of motion picture cameras taking their pictures at the same time to close tolerance. Maximum possible deviation of shutter position in this system, which utilizes circular rotating camera shutters, is less than one degree (1°), which at 12 frames per second is equivalent to an accuracy of 23 microseconds. (A microsecond is one-millionth of a second.)

Pulse-Operated Deficiencies Overcome

As frame frequency increases, the angular accuracy remains essentially unchanged, while the time accuracy decreases. For example, at 50 frames per sec, the angular deviation is still approximately 1° and the time accuracy has increased to a maximum deviation of 35 microseconds. Due to the nature of the continuously-rotating system, failures common to pulse-operated systems are eliminated.

The Servo-Sync camera drive system has been applied to a 35-mm camera of standard manufacture which uses interchangeable magazines having capacities of 400 and 1000 feet of film. The system is not limited to one camera type but is equally applicable for use with a large number of motion picture, scientific, and ribbon-frame cameras, and motion picture and process projectors.

The 35-mm camera system was developed for Wollensack Optical Co.

This system will be utilized for data recording flight testing, missile tracking, ordnance evaluation, and most applications where two or more sources of information must be recorded simultaneously.

There is no practical limit to the number of cameras (projectors) that may be synchronized by this method. An interesting use lies in three-dimensional studies where two geometrically-oriented cameras are required for simultaneous recording. The system also has application in professional and television motion picture production where extremely close time synchronization of a number of cameras, projectors, or sound-recording apparatus is required.

Month Sees Phenomenal Increase in IA-IP Radio Ham List

By AMOS KANAGA, W6BAA
Sec., Local 419, San Mateo, Calif.

THIS mouth shows a phenomenal increase in our list of IA radio amateurs. We have quite a few to thank for this but top honors should go to W6MU, A. Houston Barnett, L. 695, Los Angeles, who is also a Gold Award "Worked 25 IA-IP" winner. To date it looks as if Local 695 has the largest number of radio amateurs on its rostrum with Local 150 (also in the Los Angeles area) running a close second.

Other contributors to our list were award winners W6PFF, Frank Champlin, L. 150; W1BVB, Don Fancher, L. 439, New London, Conn.; W6FOP, George Abrams, L. 297, San Diego, Calif.; and VE7ALW, Merle Wilson, L. 348, Vancouver, B. C. Our first "Worked 10 IA-IP" winner W4PKT, Marion Sanders, L. 507, Macon, Ga., is still in there plugging for the 25 achievement award.

A salute to IA President Walsh and to IP for their splendid cooperation in making these Achievement Awards possible.

QST ran an item on our lists available to IA men and, Brother, did we run out of them fast! Our good friends at IP kicked through with a pile of extra copies of IP to help fill in the gap—but for this time only. We cannot continue to impose on them so fellows *please* get your subscription in to them or send word to me. You sure did all right on those subs this month, so let's keep the good work up—and in fact try to do even better as we go along.

Looking over the list, we note that some districts are not too well represented. So if any of you fellows in the W3, 4, 5, 8, 9, and ϕ districts know of someone we missed, shoot in his call and IA Local number. These are heavy IA districts and they should make a much better showing.

You gang are keeping us up late checking over your logs for IA-IP awards, but this is FB by us. In fact we are surprised that some of you who have made the "worked 10" award have already shot in your additional 15 or more contacts to qualify for the Gold award. Yes, a man can win both. Be sure to remember when sending copies of

IA-IP 'HAM' LIST

CALL	NAME and LOCAL
W1ADM	Carl Scheffy—L. 334
W1BCE	C. J. Crowley—L. 459
W1EBO	Woodrow Guile—L. 459
W1LW	Norman Soules—L. 459
WINZE	Arthur Madsen—L. 182
W1BHJ	Otto Halquist—L. 182
W1WI	Tom McNamara—L. 505
W1BVB	Don Fancher—L. 439
W1IYY	Harold Wyman—L. 96
W1JBU	George Gravell—L. 96
W1BTW	J. Roland Lizotte—L. 546
W1JWN	Theodore Kahn—L. 86
W1KKJ	Howard Bruya—L. 505
W2TSN	Victor Bufis—L. 365
W2WZX	Erich Pattky—L. 244
W2CYQ	Frank Larham—L. 108
W2ARP	Fred Ramhorst—L. 534
W2NFU	Sydney Trisch—L. 306
W2RUA	Hugh Newcomb—L. 462
W2QYQ	Alfred Beckett—L. 462
W2VSQ	Frank Tamborel—L. 306
W2OCL	Edward Ricca—L. 306
W2MYJ	Mike Revzin—L. 306
W2ORS	Charles Roop—L. 418
W2DZA	Alex Knight—L. 353

your logs that ANY postwar QSO counts and that all that is needed is the contact's call, his Local number, and dates worked. QSL cards are not necessary.

We lost a wonderful friend in the sad passing of Brother Harry Sherman. Those of you who have expressed your heartfelt sympathy, and that group who when told about it over the air during their midnite chat held a minute of radio silence out of respect to his passing, speak eloquently on his behalf. He will be missed.

73.

Official IA-IP calling frequencies:

3950	14,250
7250	28,700

A. Houston Barnett, W6MU, member of Sound Technicians Local 695, Hollywood, has been a ham since 1919. Barnett is a sound recorder at Paramount studios; a member of the SMPTE and IRE; and a winner of one of the first "Worked 25 IA-IP" gold awards.

W2AOM	Jack Garritson—L. 306
W2NAJ	Peter Hurgon—L. 306
W2AMB	Fred Huff—L. 306
W2ZCE	John V. Richards—L. 1
W2RQZ	Frank Lipinske—L. 337
W2HRJ	Charles Beckett—L. 462
W2BOR	William Axton—L. 524
W2HWF	Albert Dietricht—L. 306
W2BDK	Lloyd Matteson—L. 290
W2PVB	Kenneth H. Allfrey—L. 290
W2HP	Jack North—L. 640
W3KNY	Harris Good—L. 661
W3MEY	Leo Foran—L. 335
W3BBV	Nelson Stover—L. 283
W3JMA	Ralph Rushworth—L. 181
W3PMY	John Nordine—L. 296
W3MHE	Charles Gibson—L. 444
W3BJ	Al Edwards—L. 307
W3RXT	Bernard Rask—L. 171
W3TVM	Harry Drew—L. 171
W4BWN	Bob Cobble—L. 405
W4HJC	Arlie Belflower—L. 225
W4MCT	Jim Davis—L. 552
W4NOM	Buddy Rogers—L. 225
W4PKT	M. H. Sanders—L. 507
W4CIU	Bill Britton—L. 537
W4FGG	Marvin Storler—L. 144
W4RFF	Howard Ross—L. 574
W4RMT	E. M. Karcher—L. 482
W4KBJ	James File—L. 290
W4MEP	J. Wyatt—L. 793
W4FGK	D. Holye Knight—L. 412
W4DPT	Adrian McCroskey—L. 446
W4SMR	Roy J. Allison—L. 623
W4AUS	Charles M. Moore—L. 568
W4AEI	Austin S. Baumann—L. 507
W4EHC	Roland E. Coffee—L. 808
W4HRR	Joseph R. Good—L. 518
W4IU	Rupert E. Carter—L. 225
W5MPG	Rex Parker—L. 204
W5IIP	Pat Talbot—L. 249
W5DYV	Paul Belian—L. 604
W5CQ	Ray J. Morrow—L. 597
W5CQQ	Rajmunt J. Machu—L. 597
W5IMT	A. S. Johnstone—L. 293
W5OQJ	Norman Olstad—L. 279
W5ODA	William Couse—L. 450
W6BAA	Amos Kanaga—L. 409
W6UZA	Malcomb Keele—L. 150
W6DPU	Roy Brann—L. 150
W6PFF	Frank Champlin—L. 150
W6PQS	Joe Wilson—L. 504
W6ALO	Tom Jentges—L. 504
W6GTP	E. Schwartz—L. 695
W6MTO	Leroy Wardel—L. 762
W6DYJ	Ed Pothier—L. 215
W6IV	Delos Trim—L. 297
W6PB	Dan O'Brien—L. 159
W6RKB	Bob Gillespie—L. 241
W6YWC	Lewis Howard—L. 162
W6EFL	A. H. Whitney—L. 150
W6EAQ	E. L. Kline—L. 150
W6CAG	August De Grazia—L. 150
W6CYW	Frank Hemerlein—L. 150
W6KNI	Cliff Schwander—L. 150
W6REH	Harry Gould—L. 150
W6BPT	Roy Pinkham—L. 431
W6FBW	Elbert Amarantes—L. 431
W6WPG	Robert Hyde—L. 796
W6IDY	Dom Lucido—L. 241
W6EP	Leslie Hewitt—L. 695
W6HK	Frank Creswell—L. 728
W6YDU	C. R. Putnam—L. 490
W6BWI	Harry Morse—L. 297
W6VTX	Ralph Addy—L. 521
W6EIR	Leroy Ward—L. 521
W6ZOK	Max Miller—L. 521
W6FGV	Norman Owens—L. 521
W6BEP	C. C. Applegate—L. 187
W6WPG	Robert Hyde—L. 796
W6ZEN	Floyd McPherson—L. 709
W6FOP	George Abrams—L. 297
W6AGN	Arthur Hansen—L. 297
W6EWU	Tom Wells—L. 297
W6YBC	Hansen Cresap—L. 297
W6ZBX	George Kaiser—L. 297
W6CZK	Ray Baumann—L. 434
W6CML	Tom Moore—L. 169
W6IYT	L. H. King—L. 796
K6CH	H. H. Quackenbush—L. 510
W6GCF	Charles Busby—L. 599
W6HUE	Homer Elias—L. 599
W6UVO	Edward Ives—L. 150
W6WER	Clarence Woerth—L. 150
W6RN	Lynn Bradshaw—L. 162
W6PB	Dan O'Brien—L. 159
W6MJ	Edwin T. Luckey—L. 776
W6FHQ	"Barney" Harris—L. 614
W6YIY	Victor Eiserbraun—L. 150
W6FTF	Ellis Phippen—L. 150
W6GWS	David S. Horskey—L. 659
W6RWT	Charles Tucker—L. 368
W6KQW	Robert McKinley—L. 297
W6EUW	Anthony Bayer—L. 504
W6MU	A. Houston Barnett—L. 695
W6BQR	Joel F. Moss—L. 695
W6KYL	J. A. Goodrich—L. 695
W6TL	C. A. Riggs—L. 695
W6FKZ	Rou Raguse—L. 695
W6LJY	A. Kenneth Tatum—L. 695
W6EJH	Jack Lilly—L. 695
W6DDQ	Phillip Wisdom—L. 695
W6CJ	Perry Stilley—L. 695
W6HLK	Charles Noyes—L. 695
W6OL	Frank Maher—L. 695
W6TY	Gene P. Merritt—L. 695
W6WY	Howard Fogetti—L. 695
W6YW	Art Dixon—L. 695
W6AOR	Francis Sarver—L. 695
W6JC	Victor Presbrey—L. 695
W6DP	William Snyder—L. 695
W6GFI	Roy Meadows—L. 695
W6UZW	Glenn Porter—L. 695
W6BWF	James Miller—L. 695
W6TVN	Edwin Van Gundy—L. 695
W6KP	Oliver Garretson—L. 695
W6RP	S. Lambert—L. 695
W6LJW	George Hammer—L. 695
W6HXX	Gordon Sawyer—L. 695
W6WQ	Charles Slyfield—L. 695
W6MBD	Harry Leonard—L. 695
W6HI	Harold Bumbaugh—L. 695
W6TS	Edward Willis—L. 695
W6VL	Tom Lambert—L. 695
W6QJ	Charles Hisserich—L. 695
W6IZ	Edmund Hansen—L. 695
W6SWM	Charles Cohn—L. 695
W6WV	Robert Cook—L. 695
W6RW	Roger Mace—L. 695
W6LGU	Alfred Cline—L. 659
W6SIM	Everett Douglas—L. 776
W6KVI	Wilbur Johnson—L. 776

(Continued on Page 29)

SMPTE CONVENTION

(*Continued from Page* 15)

some Convention registrants to difficulties of projection that had never previously suggested themselves even during long years of experience:

. . . under the stars, with high ambient noise level. When, as in destroyers, a propeller shaft is directly beneath the point where the projector is set up the open air 'booth' has a vibrating platform. . . . The screen flaps like a sail, but if "the ship is traveling by itself, with no particular time schedule for arriving at any one particular port, or where a ship can make up lost time, the Commanding Officer will normally slow . . . down . . . or even change course for the duration of the show. This permits a properly lashed down screen to remain in place without too much flapping."

Since projection takes place outdoors and at sea a bright moon tends to dim down the picture.

Aboard larger vessels, such as battleships or cruisers, an inside location may be available, but "the high ambient noise still governs and projection conditions are extreme with regard to securing satisfactory sound distribution. . . . Cross winds, engine room blower noises, noise of the ship underway—all act to hinder the intelligibility of sound to a maximum extent."

As the speaker paused in his presentation an unidentified registrant was heard to say somewhat loudly: "And still some of us think we have troubles!"

Magnetic Records

In the Drake Hotel, but outside the Convention hall, RCA demonstrated a new magnetic recording system while at the Convention itself representatives of Bell and Howell Co. and DeVry Corp. demonstrated and described their own latest developments in magnetic tracks. Papers and subsequent discussions abundantly brought out the need for standardization in magnetic soundtrack practices; a problem the Society has taken under advisement.

Particularly stressed in the discussions was the complication introduced by current use of half-width and full-width magnetic tracks in 16-mm. The latter cover the entire track area, but the former is only half the usual soundtrack width with the remaining area occupied by a half-width optical track. Thus there are two tracks, one optical and one magnetic, on a single film; an arrangement that possesses some obvious advantages for export. However, when such half-width magnetic tracks are played back through a full-width magnetic reproducer the reproducer suffers wear on one side only and quickly becomes useless. (The iron oxide of the magnetic

soundtracks is an excellent abrasive—"rouge" used for polishing optical glass, as in grinding lenses, is also an iron oxide.)

The demonstrated RCA magnetic recorder-reproducer is designed to produce magnetic records for motion pictures, TV or other purposes at exceptionally low cost. It uses half-width film, 17½-mm. The film runs at half normal speed, or 45 feet per minute; however, the resolution achieved permits subsequent transcription to a normal track with acceptable high frequency response. A variation of the same equipment uses 16-mm stock at 36 feet per minute. Reduction in apparatus cost, film cost and film storage space are the objectives of the new design.

Bell and Howell Co. presented a 16-mm projector designed to reproduce both optical and magnetic soundtracks, and containing in addition facilities for recording and erasing magnetic sound. It can reproduce sound which it has itself recorded. Designated the Bell & Howell 202 Projector, the mechanism is described as essentially a conventional B. & H. model to which magnetic track facilities have been added. A relay which opens automatically at any interruption of forward running of the film, and cannot be re-closed except by manual intervention of the operator, minimizes the chance of accidental erasure of magnetically-recorded material.

E. W. D'Arcy for DeVry Corp. described and demonstrated both the methods used to apply magnetic sound to existing 16-mm equipment currently in the hands of the Armed Forces, and also combinations of magnetic narrative soundtrack with optical background or effects soundtrack. Engineers can be competitors who are respectful toward each other's achievements and D'Arcy was publicly complimented on the quality of his sound by Bell & Howell's M. G. Townsley.

For Better Take-Up

An automatic torque controller for torque motors used for film take-up was presented in principle by Carl E. Hittle of RCA. Its essential elements are a pivoted arm riding on the film being rolled up and rotating through an arc as the amount of film on the reel increases; a multiple-step rotary switch actuated, step by step, as the arm pivots; and a set of resistors which are connected to both the switch contacts and the motor and thus control the torque of the motor as they are switched into or out of service by the growing diameter of the film roll. As the size of the roll increases so, proportionately, does the motor torque. Film tension can be maintained constant within 2 ounces of an 11-ounce standard, as compared with friction clutch or uncontrolled torque motor deviations of 600 percent under comparable conditions, it is claimed.

Only 50% Correct Focus

A large number of registrants remained to the end to hear the paper with which William Borberg of General Precision Laboratory closed the Convention—a discussion on "Buckle Reduction in 35-mm Film" in which the speaker disclosed that a typical motion picture is out of focus 50 percent of the time it is on the screen and "This is the best the projectionist can do."

The type of buckle referred to is a temporary, not permanent, deformation of the film while it is in the aperture. The deformation is caused by the fact that the film is partially opaque and therefore absorbs light energy; this energy, being absorbed, can no longer manifest itself as light, but only as heat. Film is composed of two elements, base and emulsion; the heat resulting from absorption of light causes the film to act like a bimetallic structure and buckle, or bulge. The emulsion, being more opaque than the base, absorbs more energy, and thus forms the convex side

of the bulged film. "The magnitude of the deformation . . . is more than sufficient to affect the sharpness of image focus.

"The emulsion side of 35-mm film is toward the light source; and hence the film tends to move toward the light, away from the lens, while it is in the aperture.

"In accordance with accepted terminology, the deformation is called *negative* when the emulsion side is convex and conversely, *positive* when the emulsion side is concave. (A condition that may be encountered in cold film). Flat film is considered to have *zero* deformation.

"Instantly upon registration of the film frame with the aperture the shutter uncovers the light for the first exposure of the cycle. . . . The expanding emulsion causes the exposed portion of the film frame to move from its initial zero or positive position . . . to a negative position. The film in the gate takes a somewhat spherical shape. There is a constantly increasing deformation during the first exposure, and a constantly changing distance of the emulsion surface with respect to the lens. Upon interception of the light by the flicker blade, further movement of the film surface towards the light source comes to a halt. . . . Instead, there is a loss of heat which causes the film to recede slightly toward the zero plane. At the start of the second exposure, the film surface stands somewhere between zero and its former maximum negative position. During the second exposure the film continues its excursion negatively, first rapidly, then leveling off. At the end of this exposure the film reaches a more negative position than at the end of the first exposure . . .

Projectionist Is Handicapped

"The projectionist, whose eye cannot follow this rapid sequence of events (48 times per second) has to pick a 'best average focus' position of the projection lens. . . . For the conditions demonstrated . . . good optical performance is attained during only about 40% of the first exposure and 60% of the second exposure, or a total of only 50% during a complete frame cycle. This is the best the projectionist can do. The figures . . . demonstrate the magnitude of the effect with which we are concerned."

After describing the laboratory equipment through which this effect was observed and measured, the speaker took up the question of correcting for it, and declared:

"The technique of air blast cooling of film, by which opposing air forces of the front and rear jets are adjusted so as to produce a force for positioning the film, was found to be at best a partial solution. . . . It is possible . . . by this

method . . . to shift the average focus position; but the resultant force acts upon the film continuously, and therefore cannot correct for the intermittent cyclical frame deformations. . . . The center of each frame travels over a range of about 0.020 or 0.030 in. This range is not greatly reduced by application of a continuous displacing air force. . . . The air serves primarily as a cooling agent, preventing possible damage to the film in form of embossing or blistering or the formation of permanent buckle.

". . . because of the cyclical nature of the film frame deformations involved, any corrective action to neutralize the defects should be similarly cyclical. Hence, the following approach was tried:

"The air from the front jet was modulated by means of a rotary valve driven from the shutter shaft.

"The air from the rear jet was not modulated. The steady stream of air from this jet was used to force the film toward the lens, thus partly neutralizing the internal forces which tend to make the film, under the influence of light, take a deep negative buckle.

"The correcting air pulses from the front jet were timed so that the resultant forces from both front and rear jets opposed the cyclicly varying buckle forces. The motion of each film frame on the optical axis could thus be controlled.

". . . the position of the film frame can be held steady within fairly close limits . . . the excursions of the film frame surface can be confined to the depth-of-focus range of the lens. Good optical performance is thus obtained over the entire frame cycle . . . there is marked improvement in screen image definition."

OTHER CONVENTION PAPERS

Following are brief accounts of some of the other papers presented at the Convention:

DUAL THEATRE TELEVISION SYSTEM

Victor Trad and Ricardo Muniz
Trad TV Corp., Asbury Park, N. J.

A new instantaneous dual theatre projection television system of the Schmidt type was described. A simple control box providing almost instantaneous changeover, in the event of breakdown, and mechanical arrangements facilitating ease of installation and maintenance were discussed.

INSTALLING GPL VIDEO FILM IN DENVER'S BROADWAY THEATRE

John M. Sims
General Precision Lab., Pleasantville, N. Y.

An account of the commercial and technical phases of a typical Video-film installation. Public relations, local ordinances, utilities and other complications were described.

NOMENCLATURE FOR MOTION PICTURES AND TV

W. H. Offenhauser, Jr.
New Canaan, Conn.

Major differences of meaning are encountered in the specialized language of motion pictures and television; efforts to eliminate the technical nomenclature problem must be well planned and executed if they are to succeed. Several attempts were listed and related past experience reviewed.

SIMPLIFIED PREAMPLIFIER WITH HIGH GAIN, LOW DISTORTION, AND EXCEPTIONAL DYNAMIC RANGE AND FREQUENCY RESPONSE

Chester E. Beachell
National Film Board of Canada, Ottawa, Ont.

Description of an extremely stable two-tube preamplifier which will realize gains approaching the mu of the pentode in the circuit. Hand-picking tubes is unnecessary. It is particularly useful in magnetic playback, phototube, microphone and variable reluctance phono preamplifier applications. There are only twelve components in the basic circuit, including tubes.

New Long-Throw RCA TV Tube

A new TV tube designed for theatre video systems requiring a projection throw of the order of 80 feet has been anounced by RCA and designated the 7WP4. It provides a video screen image measuring 15 by 20 feet.

Essential innovation of the new tube is the curvature of the tube face. This matches the curvature of a spherical mirror used for the new long throw. Previous RCA theatre TV tube—the 7NP4—had a face curvature adapted to a spherical mirror used for projection throws of the order of 60 feet. Addition of the new tube and new optics to RCA's line of equipment means that a greater variety of theatres can now be supplied with large-screen TV without internal reconstruction.

The 7WP4 is an 80,000 volt, forced-air-cooled unit, measuring approximately 19½ inches long and 7 inches greatest diameter, adapted to electrostatic focusing and magnetic deflection.

LETTERS TO THE EDITOR

To the Editor of IP:

With reference to your "Mr. Mitchell Compares Notes," under "Letter to the Editor" in the March 1952 issue of INTERNATIONAL PROJECTIONIST, regarding the oiling of Motiograph take-ups:

Since the advent of our AA projector, Motiograph has used a semi-hydraulic take-up which uses the same type of grease as we use in our AA intermittent movement. Any use of a lighter oil will result in oil leakage along the shaft into the lower magazine, and will also result in a very erratic action of the take-up itself. When proper lubricant is used this take-up can be adjusted to take up film on any size hub from one to five inches without any additional parts or difficulty.

On our previous Model K take-up the continued use of oil will again cause serious take-up troubles. Oil on the cork faces of the take-up will cause small warts or raised spots on the cork discs which will result in very erratic take-up action. Proper and satisfactory operation of these take-ups requires keeping oil away. The disc surfaces should be lubricated periodically (every three to six months, depending on the running time of the theatre) with just a small amount of graphite or bicycle chain lubricant brushed on the cork faces.

If oil is inadvertently used and trouble does develop, take-up should be dismantled and thoroughly washed with carbon tet or kerosene. Then reassemble take-up using a small amount of fine valve-grinding compound on the disc faces. Place an empty reel in the lower magazine, start the projector and hold the reel so that it doesn't turn. Two or three minutes of this will usually be sufficient to smooth up the surface of the cork again. Again disassemble the take-up and wash. Coat the cork surface with graphite or chain lubricant and re-assemble. Take-up can then be readjusted and will work perfectly.

My answer to this is not with the idea of becoming involved with any projectionist on the "oil or not to oil" problem, but only to place our own take-up care instructions in the hands of the country's projectionists for the mutual benefit of all concerned.

J. E. HUCKLEBERRY,
MOTIOGRAPH, INC.,

Gregg Ends World Tour

Ending a world tour, E. S. Gregg, Vice President and General Manager of Westrex Corporation, is back in his New York office after a series of visits to Westrex subsidiary companies abroad. Gregg's trip took him to Ireland, England, Italy, Indonesia, Hong Kong, the Philippine Islands and Japan.

The First "Moving Picture Machine"

This description and picture of Thomas Edison's first "Kinetoscope" were printed in *The Times* of London in 1894, reprinted from *The Times* by *Scientific American* for November 10, 1894, and recently resurrected from those historic files by *Image*, the Journal of Photography published by George Eastman House.

THIS instrument is to the eye what Edison's phonograph is to the ear. The moving and, apparently, living figures in the kinetoscope are produced in the following manner: Mr. Edison has a stage upon which the performances he reproduces are enacted. These performances are recorded by taking a series of 43 photographs in rapid succession, the time occupied in taking them being one second only. Thus every progressive phase of every single action is secured, and the photographs are successively reproduced on a film of celluloid. When this film is passed before the eye at the same rate of speed as that at which the photographs were taken, the photographically disjointed parts of a given action are united in one complete whole.

Thus supposing a person to be photographed taking off his coat—as is done in one case—the successive views representing the phase of action at every forty-third part of a second are joined up, and the complete operation of taking off the coat is presented to the eye as it would appear in reality.

The apparatus in which the reproduction takes place is a cabinet about 4 ft. high, 2 ft. wide, and 1 ft. 9 in. deep. It contains the celluloid film band, the apparatus for reconstructing the disjointed views, and a small electric motor for driving the apparatus. The chief detail of the mechanism is a flat metal ring having a slot in it, which makes about 2,000 revolutions per minute. The film passes rapidly over the ring, beneath which is a light. The spectator looks through a lens on to the film, and every action recorded on it passes under his view.

Ten machines were shown, in which the most rapid and complex actions were faithfully reproduced. One scene represents a blacksmith's shop in full operation, with three men hammering iron on an anvil, and who stop in their work to take a drink. Each drinks in turn and passes the pot of beer to the other. The smoke from the forge is seen to rise most perfectly.

In another view a Spanish dancer is shown going through her graceful evolutions, as is also Anna Belli in her serpentine dance. There is likewise a wrestling scene and a cock fight, in which feathers are seen to fly in all directions. All the features of an original stage production are given, of course on a small scale, but possibly only for the present, for Mr. Edison promises to add the phonograph to the kinetoscope and to reproduce plays. Then by amplifying the phonograph and throwing the pictures on a screen, making them life size, he will give the world a startling reproduction of human life.

TESMA Appoints John Sims

John M. Sims, theatre TV Sales Manager for General Precision Laboratory, has been appointed to membership in TESMA's Federal Legislation Committee. It is through this committee that the Theatre Equipment Supply and Manufacturers Association studies the probable effects of proposed new Federal laws on the motion picture industry, and submits appropriate reports to its members. TESMA President J. R. Hoff, who is also President of the Ballantyne Company, announced Sims' appointment.

IA-IP HAM LIST

(*Continued from Page 22*)

W6CKP Bill Crossby—L. 659
W6CMN William Schuch—L. 659
W6PRQ Cal Mehl—L. 728
W6MIM John Tribby—L. 695
W6HDR Dave Josephson—L. 728
W6DDF Harry Foy—L. 695
W6HPQ Lou Hippe—L. 706
W6DDA Ken Schouten—L. 44
W6KZM Phil Faulkner—L. 695
W6BK Bill Anderson—L. 695

W7LAT Fred Jones—L. 720
W7PEC Jim Harford—L. 720
W7AXY John Murphy—L. 91
W7ALM Chester Lamont—L. 446
W7FJZ Z. A. Sax—L. 159
W7HE Dee Hart—L. 91
W7HPF John Gilbert—L. 91
W7GXN Edwin McMurray—L. 180
W7IIJ Donald Johnston—L. 401
W7AVM J. Elmer Newell—L. 429
W7JTM J. Allen Evans—L. 294
W7OAS George Olson—L. 294
W7KMO James A. Furr—L. 294
W7FTV Lloyd J. Hagaman—L. 240
W7NCR Joseph Metzger—L. 720
W7OPE Edmund Daddow—L. 91
W7KBZ Earl Tosland—L. 180

W8IG Frank J. Riley—L. 160
W8VDP Jack Harwood—L. 160
W8BYT L. Grazier—L. 388
W8NS Carl Bacon—L. 199
W8WSL Denzel Murphy—L. 239
W8OWK Edw. Miller—L. 199
W8EEW Muriel Murtagh—L. 291
W8QIX F. W. McDonald—L. 199
W8QFK Jim Robinson—L. 64
W8BWU James T. Smith—L. 100
W8CHI C. W. Salchli—L. 315
W8FUR Norman Pingel—L. 735
W8ZXD Dan Defenbaugh—L. 735
W8IAC Adrian McCroskey—L. 406

W9NLP Rolly Long—L. 110
W9OL W. P. Atchison—L. 323
W9NPG John Bain—L. 323
W9LBL R. B. Connelly—L. 110
W9EDW Harold Nelson—L. 221
W9RTA Herb Kleinbeck, Sr.—L. 110
W9FOL Merrill Smith—L. 110
W9AZA Kenneth Mass—L. 721
W9GQD Clarence Hawkins—L. 263
W9DBY Kenneth G. Alley—L. 421
W9VNV Charles Mitten—L. 194
W9PTG Clifford S. Smith—L. 414
W9PTH Larry Applegate—L. 187
W9HG E. M. Renfroe—L. 110

WφZIM M. Geiskieng—L. 230

WφGSW James E. Evans—L. 242
WφJKU John Cresap—L. 242
WφUOP Clair Rockholz—L. 286
WφWSH Herschell Allredge—L. 443
WφDOL E. M. Karcher—L. 482
WφSJK O. S. Keay—L. 219
WφSLV Walker Faussett—L. 395
WφBTT R. R. Kerwood—L. 586
WφWHV Max Hollingsworth—L. 465
WφBVO Paul Hunter—L. 191
WφQI E. D. Van Duyne—L. 191
WφBSO Don C. Atherton—L. 191
WφGFN Ira Hasket—L. 491
WφVBZ R. H. Hecht—L. 143

CANADA:

VE1ACB F. J. McGuire—L. 680
VE1DQ Art M. Crowell—L. 680
VE3ABV Jack Snider—L. 173
VE3BAK F. Winkle—L. 173
VE3BVC E. H. Whyat—L. 173
VE3BWG Lou Lodge—L. 173
VE3DBF M. Winslow—L. 461
VE3OG H. Horner—L. 173
VE3TE Tom Burrows—L. 173
VE3APR Harry McClelland—L. 582
VE5JK Jack Kyle—L. 295
VE5AR L. W. Nelson—L. 406
VE7OT M. Thoreau—L. 348
VE7US C. Moorehouse—L. 348
VE7MN C. H. Richards—L. 348
VE3AYQ Cecil D. O'Neill—L. 461
VE5RJ Ron Marchant—L. 300
VE3AHJ Walt Mann—L. 467
VE7ALW Merle Wilson—L. 348
VE7APN Jack Stone—L. 348
VE7APU Tom Hepple—L. 348
VE7BJ Edward S. Brooks—L. 348
VE7ACB F. J. McGuire—L. 680

[NOTE: Additions and corrections should be sent to AMOS R. KANAGA (W6BAA), 262 La Casa Ave., San Mateo, Calif.]

STANDARDS

(*Continued from Page 8*)

may be easily identified. Subtitles superimposed over each sample shall indicate the particular sound characteristic demonstrated by that portion of the film.

2.5 The length of the film shall be approximately 500 feet.

3. Method of Use

3.1 From a typical location in the auditorium the observer should determine whether or not the frequency-response characteristics of the complete reproducing system are normal by listening to the sound reproduced from the test film at normal sound level.

NOTE: A test film in accordance with this standard is available from the Motion Picture Research Council or the Society of Motion Picture Engineers.

IA ELECTIONS

LOCAL 164, MILWAUKEE, WIS.

Glenn C. Kalkhoff, *pres.;* Walter Behr, *vice-pres.;* Robert Lucht, *rec.-sec.;* George Brader, *treas.;* Oscar E. Olson, *bus. rep.;* August Mommer, *sgt.-at-arms;* John Black, Norman Habersat, Charles Beggs, Irvin Rotter, *exec. board;* O. Olson, G. Kalkhoff, R. Lucht, *del. IA Convention;* Kalkhoff and Olson, *del. Wisconsin State Federation of Labor.*

LOCAL 277, BRIDGEPORT, CONN.

Frank Toth, *pres.;* Joseph C. Cossette, *vice-pres.;* Roland J. McLeod, *fin.-sec.;* Thomas E. Colwell, *rec.-sec.;* Fred Lewis, *treas.;* John A. Martin, *bus. rep.;* John Lynch, *sgt.-at-arms;* Leslie C. Blakeslee, Frank Gorman, John Lynch, Joseph Kaplan, Harold Ryckman, *trustees;* F. Gorman, James Liburdi, H. Ryckman, J. Kaplan, *exec. board;* John Benard, R. McLeod, James Leverone, Joseph Cink, J. C. Cossette, *del. Central Labor Union;* J. Martin, *convention del.* and F. Toth, *alter. convention del.*

ARCLAMP GENERATORS

(*Continued from Page* 12)

mica, chamfer edges of bars if necessary, clean and dress.

7. ARMATURE MAKES CLICKING OR POUNDING SOUNDS

Trouble: Armature striking or rubbing against pole-pieces. *Cause:* Misadjusted or worn bearings. *Remedy:* Shim the bearings or, if loose, replace with new bearings. Check air-gap at top, bottom, and both sides with a feeler gauge to make sure the gap is uniform after work on the bearings has been completed.

8. GENERATOR FAILS TO BUILD UP VOLTAGE

Trouble: Residual magnetism of field poles lost. *Cause:* Reversal of magnetic polarity because of wrong connections when sending battery current through field windings for testing purposes. Use of alternating current for testing field windings. (Loss of magnetism sometimes occurs without apparent cause, however.) *Remedy:* Bring the carbons in one projector lamp together tightly, throw on the arc-lamp switch, then turn on the generator motor. If voltage then starts to build up, turn off the arc switch before voltage attains full value. This failing, re-establish field magnetism by connecting a 45-volt radio B battery across the generator terminals. Be very sure that the positive terminal of the battery is connected to the positive output terminal of the dynamo, and negative to negative. Break the battery circuit the moment the generator starts to build up.

Trouble: Open circuit in voltmeter or arc circuit. *Cause and Remedy:* Cause lies outside the generator, as the generator really builds up even though external defects prevent the voltmeter from registering the output voltage.

Trouble: Short or open circuit in armature or field. *Cause:* Insulation worn off or broken. *Remedy:* Repair or replace field coils, varnishing them with baking varnish (which *must* be baked) or with Glyptol, a preparation that requires no baking. Replace armature until repairs to the defective armature can be made in the shop.

9. GENERATOR POLARITY REVERSED

Trouble: Direction of rotation reversed. *Cause:* Driving motor running in wrong direction. *Remedy:* Change direction of rotation by interchanging any two of the three leads of 3-phase motors, or by interchanging the two outside *or* the two inside of the four leads of 2-phase motors.

Trouble: Residual magnetism reversed. *Cause:* DC test current sent through the field coils in the wrong direction. Very rarely, static electricity picked up by arc circuit during a violent thunderstorm reverses the polarity of the residual field magnetism. *Remedy:* Re-establish correct polarity of residual magnetism by connecting the positive terminal of a 45-volt B battery to the *normal* positive terminal of the dynamo; likewise connect the negative terminals. Switch the motor-generator set on and break the battery circuit as soon as the dynamo builds up with correct polarity.

[THE END]

For Uncle Sam—*& YOU*
SAVE EVERY OUNCE OF COPPER

MONTHLY CHAT

(*Continued from Page* 3)

through an obsolete amplifier but he has no authority to buy new amplifiers. What he can do, as a competent craftsman in a field in which his manager or owner quite possibly has no trace of competence, is to call emphatic attention to equipment conditions that need correction as a prerequisite to high quality performance.

And if management will not make the necessary corrections it may not be too bad an idea to think about looking round for another job, for all indications are that the theatre that tries to get by on the "shooting gallery" basis of the past is not likely to get by on that basis much longer.

It was a bright early December day and Lieutenant Hudner was flying a Korean combat mission alongside another plane piloted by Ensign Jesse Brown. A burst of flak

caught the ensign's plane and he went spinning down, aflame. Lieutenant Hudner then deliberately crash landed near his flame-trapped shipmate. He radioed for help, after which he fought to keep the fire away from the fatally injured ensign until a rescue helicopter arrived. Today Lieutenant Hudner says:

"Maybe if America had been strong enough to discourage aggression two years ago, my friend, Jesse Brown, might be alive right now. So might thousands more of our Korea dead.

"For it's only too sadly true—today, in our world, weakness invites attack. And *peace is only for the strong.*

"Our present armed forces *are* strong—and growing stronger. But don't turn back the clock! Do your part toward *keeping* America's guard up by buying more . . . and more . . . and more United States Defense Bonds *now!* Back us up. And *together* we'll build the strong peace that all Americans desire!"

★ ★ ★

Remember that when you're buying bonds for defense, you're also building a personal reserve of savings. Remember, too, that if you don't save *regularly*, you generally don't save at all. So sign up today in the Payroll Savings Plan or the Bond-A-Month Plan. Buy United States Defense Bonds now!

Peace is for the strong... Buy U. S. Defense Bonds now!

Lt. (jg) Thomas Hudner, Jr. U. S. N.

Medal of Honor

INTERNATIONAL PROJECTIONIST

JUNE 1952

VOLUME 27 • NUMBER 6

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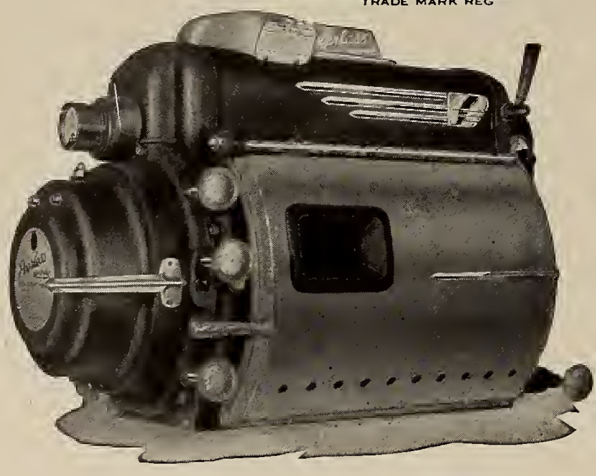

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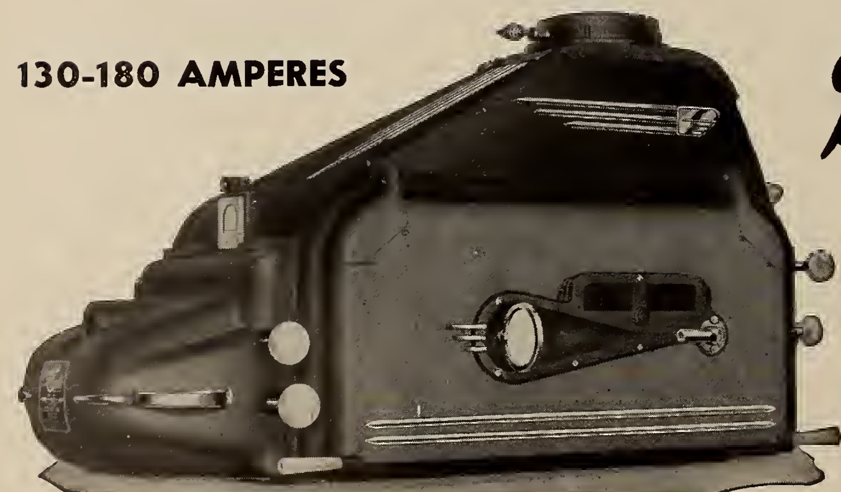

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It is the "Omega" for maximum screen brilliance. . . . Nothing can even approach it in *white* light volume when used with projectors that have efficient revolving shutters.

Assures satisfying projection for Drive-Ins regardless of the size of the picture, length of throw, and under all weather conditions. . . . They are Und. Lab., Inc. listed and, therefore, *not* insurance hazards. . . . Heat filter assures no risk of film-heat damage at maximum arc amperage and maximum screen lumens.

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INTERNATIONAL PROJECTIONIST

With Which Is Combined Projection Engineering

HENRY B. SELLWOOD, *Editor*

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MONTHLY CHAT

16-MILLIMETER projection is growing up. In terms of employment and business opportunities offered to the professional projectionist the boy still is not quite as tall as his old daddy, but he sure is sprouting. In recognition of this sturdy growth and as a service we rightly owe our readers, IP begins this month, and will continue monthly hereafter, a department devoted specifically to 16-mm projection, its swiftly changing technology and rapidly expanding business aspects, and the status of the professional projectionist with respect to it.

In 16-mm we see a typical *radiation* (as biologists call it) of an established form. In the course of evolution, the experts say, some new form of life appears, establishes itself, and then *radiates* into a great number of variations and modifications. Our technique of motion pictures can be observed today radiating on the one hand into 16-mm and its growing opportunities, and on the other hand into that intricate art (which the SMPTE has been stressing so heavily the past few years) of slowing down motion by high speed photography coupled with low speed projection. And of course film, both 16-mm and 35-mm. is nowadays projected into TV camera tubes as well as onto theatre viewing screens. These very few novel species of motion picture technique could well represent only the barest beginning of a process of radiation that may branch out into regions too broad for even the imagination of a Jules Verne.

One of the pressures that induce radiation in living things is hard times; when the animal or plant finds difficulty in getting along, any variation into a new and less precarious field possesses premium survival value. The motion picture theatre and motion picture projection with it, do not at this moment enjoy exactly lush and prosperous times; and herein we see the mechanism of radiation at work, for at this moment one of the very best-known manufacturers of 35-mm motion picture projectors has leased out a large percentage of its facilities to a well-known 16-mm projector firm and is manufacturing 16-mm mechanisms for them. Times being somewhat less than hilariously prosperous in the 35-mm field—the organization radiated.

Similarly the projectionists who formerly worked in a 35-mm theatre and now run 16-mm projectors in a TV studio or operate their own personal 16-mm enterprises, or specialize on 16-mm showings in hotels and convention halls—have radiated.

No one expects the motion picture theatre to vanish; the worst of ultra-pessimistic predictions is that owing to TV and other causes it may come to occupy a less prominent place in the national life than hitherto. But there will always be a motion picture theatre. And always, above and around the theatre and occupying a far wider and more varied field, there will be motion picture projection.

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"THERE'S A BRANCH NEAR YOU"

INTERNATIONAL PROJECTIONIST

VOLUME XXVII | JUNE 1952 | NUMBER 6

Screen Types and Picture Brightness

By ROBERT A. MITCHELL

BECAUSE the theater screen is an inexpensive item compared with projection and sound equipment, seating, air-conditioning and heating units, etc., many exhibitors mistakenly regard its condition as a trifling matter, and fail to have it replaced until picture quality becomes so poor that patrons stay away.

Actually, the motion picture screen is an extremely important part of the projection and sound set-up, for the best photography and film-printing, the most lifelike color, the most powerful arcs, and the highest-quality projection lenses all together cannot overcome the deleterious effects of a screen which is in poor condition, or unsuited to the size and shape of the auditorium. Frequent inspection of the screen is recommended —but inspection followed by *action.* The theatre owner who can stay in business today is not the one who hides from his projectionists when the purchase of a screen is suggested. Neither can the projectionist expect to survive in his craft if he remains indifferent to the fact that the screen is not giving his presentations the most advantageous display possible. The screen surface can make or break the show.

Uniformity of Surface

A screen is primarily a reflector and diffuser of light. It should be a clear white, not brown or yellow or any other tint. The first consideration, however, is *uniformity of surface*, even though, as we shall shortly see, a special kind of non-uniform screen surface actually produces more even illumination.

If certain parts of the screen are darker or lighter than other parts, the projected picture will be spoiled. A non-uniform reflective surface can be caused by a poor resurfacing job or by streaks of dust and dirt. Dents, torn places, and visible seams also ruin pictures. Incorrect hanging and stretching of the screen may wrinkle the surface and produce light and dark streaks that look like dirt. It should always be kept in mind that dents and wrinkles too small to show up on white matte screens appear enormous on aluminum-surfaced "silver" screens. In fact, an aluminized screen must be stretched even flatter than the proverbial pancake before a satisfactory picture is obtained.

The first requisite for a perfectly flat screen is a sturdy stretching frame of good quality. The tension applied to the edges of the screen by the lacing cords should be perfectly even all the way around—otherwise the surface will be marred by wrinkles that look like the spokes of a wheel. It is always a good idea to go backstage at regular intervals for the purpose of checking the tightness of the screen. There are screen materials that require several stretchings during their period of service.

As all of us know, most H.I. arc-lamps produce a side-to-center distribution of screen illumination of from 60 to 80 per cent. This means that the central areas of the picture are perceptibly brighter than the sides and corners, especially when "illuminated surround" screen set-ups are used. An edge fadeaway of from 40 to 20 per cent is a bad thing in modern motion pictures because there is a definite trend to go easy on dollying sbots, and to allow the action in certain scenes to roam all over the screen—even up or down into the very corners to produce novel effects.

The pictorial beauty and power of many Charles Chaplin productions is due in part to Mr. Chaplin's expert use of the stationary camera, as opposed to the restlessly roaming dolly, in certain types of scene. When the producer wishes to focus attention on the central areas of the picture he can do it by masking the camera lens in such a way as to produce a deliberate fadeaway framing of the picture. It used to be done often and effectively in the days before the movies found their voice.

In any case, this writer advocates even illumination of the entire screen surface, and opposes British and German protagonists of "hot-spot" projection.

At least one American screen manufacturer ingeniously mitigates the drawbacks of hot-spot screen illumination by perforating his screen only in the center (where the hot-spot occurs), and gradually tapering off the size of the perforations towards the sides of the screen. The wide *unperforated* side areas include from 50 to 75 per cent of the total screen area, depending upon the size of the screen.

Although this special screen is actually non-uniform in reflective power—the unperforated side areas reflecting about 8 per cent more light than the perforated center area through which the sound comes from the speakers—the effect of this carefully engineered non-uniformity is to produce a more uniformly illuminated picture.

Reflecting Power

The next requirement of screens to be considered is high *light-reflecting power.* All screens are to a certain extent "light eaters"; but when a screen reflects less than half the light falling upon it from the projectors, it eats up carbons and kilowatts, too. High-powered arcs and

modern large-diameter projection lenses go for naught if the screen either *absorbs* too much of the light or *transmits* too much to the rear wall of the stage.

The perforations of sound screens perforated over their entire surface decrease the reflectivity by from 8 to 10 per cent, the latter figure applying only to old-style screens which were perforated with rather large holes. This loss of light is not so serious as the attendant loss of pictorial detail in the picture. Smaller sound holes placed nearer together decrease the image-definition loss, but introduce sound difficulties due to the ease with which they become plugged up by dust deposited from air circulating through the screen.

Several attempts have been made to do away with the sound holes entirely by making screens from thin or lightweave materials. Thin solid screens are the best from the point of view of picture brightness and clarity, but it is necessary to compensate for the attenuation of the higher frequencies of sound by changing connections in the frequency-response network of the amplifier. This network is usually associated with the degenerative feedback circuit in modern amplifiers, and is conveniently tapped for ease in changing the frequency characteristics of the sound reproduction. Low frequencies—the bass notes of music and all the various rumblings and boomings of sound effects—are not appreciably impeded even by a thick canvas solid screen.

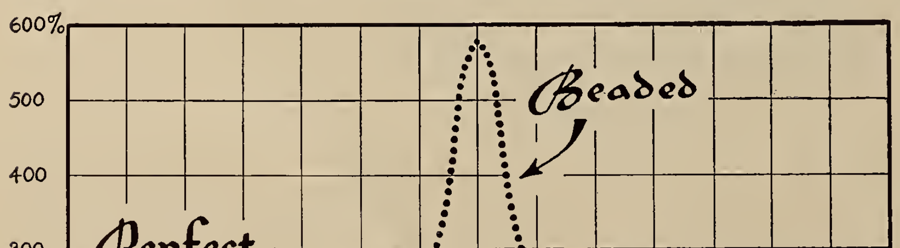
Woven materials, such as nylon cloth, allow free passage of the sound, but are ordinarily poorer reflectors than the usual types of perforated screen.

The ideal, or "perfect," screen has a reflectivity of 100%. That is to say, it reflects *all* of the light falling upon its surface, absorbing none and transmitting none. Unfortunately, the perfect screen exists only in the imagination. Although many commercial screens reflect even more than a 100% intensity of light through narrow angles (obtaining their super-brilliancy by robbing other viewing angles of light), no screen surfacing materials have been found which have a higher total reflectivity than 88 per cent —the reflectivity of a freshly shaved block of magnesium carbonate, a chalk-like substance.

Following is a list of the *diffuse reflectivities* of a number of white substances and motion-picture screen surfaces.

DIFFUSE REFLECTIVITIES

	Per Cent
Silver glass mirror	90
Magnesium carbonate	88
Magnesium oxide	86
Zinc oxide (zinc white)	82
Best solid coated canvas matte screen	80
Solid smooth plastic matte screen	80
Chalk (calcium carbonate)	80
Solid aluminized screen	76
White lead	75
Smooth white cardboard	75
Perforated smooth plastic matte screen	72
Best perforated canvas matte screen	72
White blotting paper	70
Perforated aluminized screen	68
White rag paper	65
Aluminum paint	65
Kalsomine	65
Fresh newsprint	55
Kalsomined cotton sheeting	55
Nylon cloth porous screen	50
Whitewash	50
Bleached closely woven linen	45
Solid beaded screen	45
Bleached cotton sheeting	40
Perforated beaded screen	37



Reflecting characteristics of screen surfaces. Angles of observation are indicated by the figures along the bottom of the chart; per cent reflectivity by the figures at the left. Note that the beaded screen has nearly 5 times the reflectivity of a matte screen at a viewing angle of 0 degrees, an observation angle frequently called "the normal."

A consideration of the directional characteristics of the light reflected by the white substances and screen surfaces listed above focuses attention on the third main requirement of a screen—*diffusibility.*

Diffusion of Light

A polished mirror, even though an excellent reflector of light, is worthless as a motion picture screen because it lacks the power to diffuse light. It reflects rays in directions which are completely dependent upon the directions of the rays before reflection, according to the simple geometric laws of optics. A practical projection screen must be a good *diffuser,* reflecting rays in all directions, and having little or no directional power beyond what is required in special cases.

In long, narrow theaters screens having directional characteristics in addition to diffusibility are desirable because they concentrate the light where it is most needed, e.g. on the long, narrow array of seats. Wide theatres, on the other hand, would experience difficulties with "specular" (mirror-like) screens because patrons seated outside the limits of a narrow viewing angle extending down the middle of the auditorium would see a very dim picture.

The two types of specular screens in wide use at the present time are the beaded and the aluminized screens. The resin type of specular reflecting surface familiar to everyone as Scotchlite advertising and traffic signs may also find application in specular screens.

When viewed from the center-line of the auditorium (viewing angle 0 degrees), the picture projected on a glass-beaded screen appears nearly 5 times brighter than it would on a matte (plain white) screen. If the observer moves to one side so that his viewing angle increases to 22 degrees to the normal, the picture will seem to be just as bright as one on a matte screen. At a greater viewing angle, however, the picture appears considerably darker.

The beaded screen consists of a cloth-backed white plastic material in which a single layer of glass beads, each bead 0.011 inch in diameter, is imbedded.

The aluminized screen is an ordinary screen coated with high-brilliancy aluminum paint. When viewed at an angle of 0 degrees it appears only little more than twice as bright as a plain matte screen under similar projection conditions. At an angle of 30 degrees to the normal the picture looks to be about as bright as it would be on a matte screen. At greater angles the picture on the aluminized screen is much too faint to be viewed with comfort.

Aluminized screens have another seri-

(*Continued on page* 33)

TECHNICOLOR'S APPEAL ENHANCED BY SKILL OF PROJECTIONIST

By LeROY CHADBOURNE

PROPER screening of Technicolor prints is a prerequisite to their translation in full scope of beauty to the eyes of the audience. The effort and expense the producer undertakes in turning out a Technicolor picture depends for final optimum results on the skill and care of the projectionist. All that has gone on before the print reaches him is at the mercy of his knowledge of his craft and his ability and willingness to apply that knowledge properly.

The importance of Technicolor as a means of bringing revenue into the theater box office has been proved over and over again. Trade reports have repeatedly pointed up the fact that a picture in Technicolor has in its favor a box office factor which more often than not determines the strength of its appeal to the public and consequently the revenue of the theater.

But the ultimate value of this Technicolor picture lies inescapably in the hands of the projectionist, who can either extract and lay before the audience the whole value that the producer and laboratory put into the print or can mar and spoil it.

Focusing

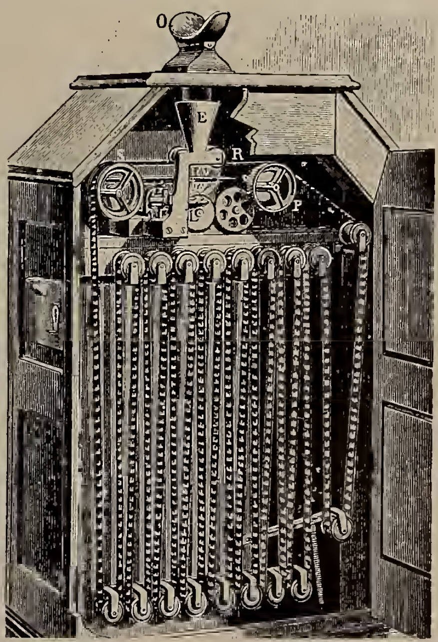
Correct focus is the most important factor in optimum presentation of Technicolor and needs continually renewed attention. Cleanliness of the entire optical system, and of the screen, are more important than in black-and-white projection. So is correct film alignment; so is correct screen illumination. On the other hand, there is no difference whatever between Technicolor and black-and-white prints so far as storing, cleaning, and handling procedures are concerned. There is no difference in the splicing methods.

The projector lens that was properly focused for black-and-white will be found not in the best position for a Technicolor print. Moreover, when Technicolor is run the focus should be re-checked at the beginning of each reel. An opera glass or similar instrument is suggested as helpful in producing a precise focus because of the distance between projection room ports and the viewing screen.

The necessity for realignment of focus when Technicolor and black-and-white are alternated lies in the fact that there is no silver in the film image of a Technicolor print, only dyes. On the other hand, the silver always present in black-and-white film causes a difference in the heat absorption between it and Technicolor print. Therefore, each assumes a different position before the aperture, hence the lens must be refocused accordingly.

Whether Technicolor or black-and-white, the focus is optimum when it brings out the grain pattern of the image. When he has done this, the projectionist need not concern himself too much with diffusion if any exists; he should remember that the cinematographer may have decided that the object shown does not qualify for maximum delineation by the camera. For example, an aged thespian (makeup experts notwithstanding) may be accorded consideration by the photographer, and the projectionist who helps such illusion by focusing for grain structure and not image structure shares and abets the responsibility of the cameraman.

EDISON'S FIRST MOVIE VIEWER



Endless film was driven through this Kinetoscope at about 40 frames per second. *E* is the lens; *S* and *R* the film passing under the lens; *V*, beneath the film, is the whirling slotted disc that acted as a shutter; and *L*, under *V*, the light. The device mounted in the left upper panel would appear to be a coin-slot and mechanism.

Cleanliness and Brightness

Cleanliness is more urgent in the case of Technicolor than of black-and-white because of the greater importance of eye-appeal in the case of the former. The print is cleaned like any other, by carefully rewinding it through a soft, clean cloth pad moistened with carbon tetrachloride. The whole projection optical system, including the aperture, and not forgetting the glass (if any) in the projection ports, should be maintained in immaculate condition. The projectionist cannot clean or replace the screen, but he can call attention of the management to any faults in its condition that detract from the value management paid for when renting a Technicolor film.

Again, the fact that eye-appeal is of greater importance in Technicolor than in black-and-white increases the importance of checking both the cleanliness of the film path and its general condition in every component, and the correctness of threading. Scratches in a Technicolor print are more important than in black-and white in the same sense that a visible flaw in a real diamond may be regarded as more important than one in costume jewelry.

In black-and-white sheer eye-appeal is more subordinate to story, cast, and sound; in Technicolor appearance as

(*Continued on page* 27)

Transmission Beyond the Horizon at 40-4000 Mc*

ONE of the commonest assumptions in radio theory has been challenged as the result of a series of experiments conducted by the Laboratories during the past few years. These experiments have indicated that the very high and super high radio frequencies, such as those used for television, radar and microwave relay systems, are not necessarily limited to approximately line of sight distances, but that signals can consistently be obtained at distances of 200 miles or more beyond the horizon.

Lower frequencies, reflected between the ionosphere and the earth's surface, can carry signals hundreds and thousands of miles beyond the horizon. Very high frequencies, on the other hand, are not ordinarily reflected by the ionosphere but continue through it, merely undergoing some refraction as they pass through atmospheric areas of varying density. Thus, the natural tendency throughout radio history has been to assume that, in general, the higher frequencies would not be useful for transmission much beyond the horizon.

Observations Disprove Theory

Scientists from Bell Telephone Labs., compiling the results of their observations, have reported that VHF signals have consistently demonstrated far greater strength at points beyond the horizon than had been expected from existing knowledge of very high frequency radio signals. The loss of power in going from within the horizon to slightly beyond is, as was expected, considerable, but accepting this loss, VHF signals were shown to decrease much more slowly with increasing distance than was predicted by existing theories.

In the series of experiments carried on by the Laboratories, the median signal levels recorded are 50 to 90 db below the intensity expected in free space but are hundreds of decibels in excess of the computed value based on the classical theory of smooth spherical earth with a standard atmosphere.

"Ducts" and "Scattering" Ruled Out

Reception of high frequency signals far beyond the horizon had been reported occasionally by previous investigators but dismissed as an irregular and undependable phenomenon. Such reception was assumed by some to be due to unusual weather conditions bringing about the presence of large volumes or "ducts" in the atmosphere having a markedly different density than the surrounding atmosphere, hence, a different refractive value. A later theory was that the normal turbulence in the atmosphere was sufficient to scatter the signal over relatively wide areas.

However, the median signal levels recorded by scientists of the Laboratories are relatively independent of meteorological conditions, indicating that the over-all reliability is much greater than would be expected from the "duct" theory. In addition, the experimental evidence on the effectiveness of directional antennas is contrary to what would be expected from the "scattering" theory.

Frequency, Weather, Don't Count

A most significant conclusion to be derived from the tests by the Laboratories relative to free-space transmission is that the received power is substantially independent of frequency, antenna height, and weather effects at points beyond the horizon. These factors have a substantial effect at or near the horizon but their importance decreases gradually with increasing distance.

The decrease in signal power in going from within the horizon to slightly beyond is greater at frequencies in the thousands of megacycles (SHF) than it is at 100 mc (VHF), but once this loss is accepted the signal decreases much more slowly with increasing distance than the extremely rapid decrease predicted by the classical smooth earth theory.

22 to 285 Miles, 3700 Mc

In tests at 3700 mc, made in the Spring of 1950, an experimental transmitter at Whippany, New Jersey, generated 1.5 micro-second pulses with a peak power of about 300 kw. This energy was fed through 250 feet of wave guide to a 10-foot paraboloid antenna mounted on top of a 150-foot tower. The receiving antenna was a 57-inch "dish" mounted on top of the truck that carried the receiving and recording apparatus.

Measurements consisted in recording the received signal from several days to a week at each of eight general locations from 22 to 285 miles northeast of the transmitter. These sites were on high ground relative to the local terrain but were all beyond the optical line-of-sight. The most distant site was at Mt. Washington, N. H., where, in spite of the natural elevation, the optical line-of-sight from the transmitter was nearly eight miles above the receiving antenna.

125 to 325 Miles, 534.75 Mc

A second series of tests during the same year made use of the 534.75-mc sound channel of an experimental television transmitter operated by National Broadcasting Co. at Bridgeport, Conn. These measurements lasted from several hours to several days at most of the receiving sites previously used for the 3700-mc test. The longest path was about 325 miles to a point near Bar Harbor, Me., half over land and half over water.

Other paths tested included a 225-mile path entirely over land to Mt. Washington, and a 125-mile path almost entirely over sea water to Gay Head on Martha's Vineyard.

183 Miles, 459.8 Mc

As a result of the tests in New England on 535 and 2700 megacycles, a 1-kw transmitter operating at 459.8 megacycles was set up at Holmdel, N. J. Two principal receiving sites were selected along the microwave relay route between New York and Chicago, one near Chambersburg, Pa., (183 miles) and the other in Pittsburgh.

A series of tests on antenna beam widths and gain were conducted on the 183-mile path to Chambersburg. These tests indicated that the signals were coming from the horizon along the great circle route, and that the antenna beam widths were not widened by more than 1 or 2 degrees in either azimuth or elevation, indicating the effectiveness of directional antennas for beyond-horizon reception.

A paper giving some of the results of the Laboratories' studies and summarizing data from other published reports was presented by Kenneth Bullington at the annual convention of the I.R.E. last March and will be published in the Proceedings.

* Bell Labs. Record, June, 1952.

NPA Eases Theatre Bans

National Production Authority's action in easing previous restrictions on use of metals by the motion picture industry has been interpreted for the industry in detail by Fred C. Matthews, who is Chairman of the Federal Legislation Committee of the Theatre Equipment and Supply Manufacturers Association as well as President of Motiograph, Inc.

According to Matthews, the new relaxation in order M4-A, effective as of July 1, 1952, permits:

Relocation of projection rooms.

Installation of stage rigging and curtain controls.

Installation of air conditioning.

Installation of new marquees, if aluminum used in them is limited.

"Just about any remodeling job."

"Complete theatres could be built if laminated wood construction was used, since the 5 tons of steel per quarter (now permitted) should permit enough steel for trusses, reinforcements, etc."

These and other interpretations of the recent relaxation of controls (all of which Matthews checked with the Chicago office of the Department of Commerce) have been announced through the official organ of TESMA, the *Tattler*.

For The
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▶ Going to the movies is part of our way of life—as American as apple pie. It is a custom observed by the family whenever and wherever good movies can be seen. For good movies are the best family entertainment investment every week of the year.
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Inspection, Splicing and Care of Film

These notes are condensed from advisory comment prepared by Eastman Kodak for film exchanges; they apply just as emphatically to theatres.

II.

SOME inspectors, fearful of obtaining badly wound rolls, bind film so tightly against the reel flange that the entire surface of the film is in contact. This results in slightly curved, diagonal abrasions across the film as shown in Figure 8. This type of damage, however, should not be confused with the short, horizontal scratches extending straight across the film and perpendicular to the length of the film. These fine scratches give rise to a pronounced crackling noise in the speaker system during projection. They may be on either side of the film and are usually caused by contact of the film with the floor, where gritty particles may be picked up and carried into the roll. Cross abrasion, such as illustrated in Figure 9, then occurs if the affected sections of the roll shift from side to side during shipment.

Cinch Marks and "S" Bends

Release print film which has become oily from passage through projectors has a tendency to lock rather than slip during rewinding. As a result, inspectors often find it necessary to rewind a roll two or three times in order to obtain proper winding.

Loose winding is, of course, to be avoided, because it encourages surface abrasion. It is still common practice to attempt to tighten a loosely wound roll by pulling on the outer lap of film. This should be avoided by all means, since both sides of the film will then show cinch marks or short lengthwise scratches. There is also the added danger of developing kinks or "S" bends in the roll (see Figure 10) which, if not straightened or removed, can cause considerable trouble in the projector.

Splicing

Buckled or bumpy splices such as illustrated in Figure 11 result from excessive scraping, which weakens the base, and too liberal application of cement. Excess cement not only distorts the weakened area when it has dried but squeezes out under pressure and attacks the base at either side of the splice, thereby increasing the possibility of distortion. On the other hand, the applicator used must be capable of carrying sufficient cement so as to completely cover the scraped area in one stroke.

The small bench-top splicer is the type most widely used in both the film exchange and theater. The pressure springs on this type splicer should be kept free of hardened cement and scrapings, and the springs should be kept properly spaced to insure satisfactory contact across the full length and width of the splice. The scraping blade should be kept sharp in order that it will remove the binder coating as well as the emulsion, since this is necessary to obtain a good splice.

Scraping blades are often kept in service long after they have become ineffective in their ability to remove the binder. During the scraping operation, contact with the metal bar tends to dull the blade. It is necessary therefore, to change the position of the blade in the holder frequently, or to replace it, so as to have the best possible working edge. Safety razor blades are very efficient in their scraping action but they can easily score

FIGURE 8

Curved diagonal abrasions caused by contact of back surface of film with reel flange during rewinding.

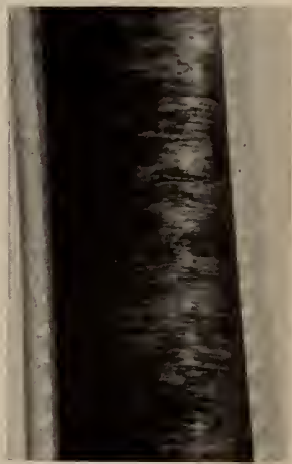

FIGURE 9.

Cross abrasions caused by gritty particles wound into the roll. Abrasions run across film because of sidewise movement of roll during shipment.

FIG. 10. Film kinks created when loosely-wound roll is tightened by pulling on outer flap of film.

FIGURE 11.

Buckled splices caused by excessive scraping and excessive quantities of cement.

the base and are therefore not recommended.

Sandpaper or emery cloth, while admittedly very effective, should not be used for scraping, because the grit particles will be picked up by oily film and carried into the roll. Such particles not only cause serious surface abrasion but may also find their way into projector bearings.

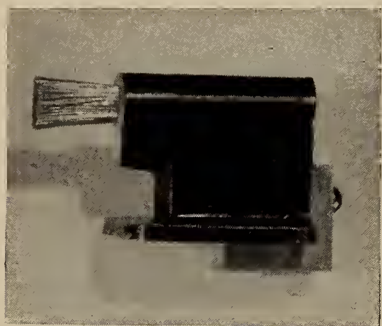

FIG. 12. Fine wire brush for bench-top splicers, available through supply houses.

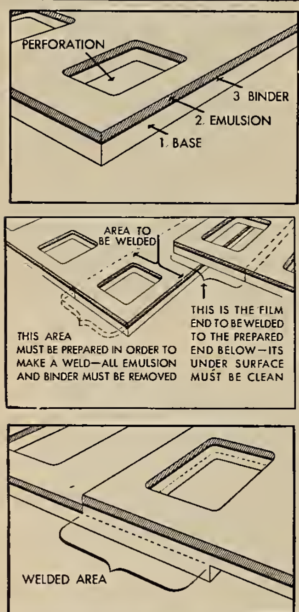

FIGURE 13. Good splicing demands effective scraping. Both the emulsion and the layer that binds the emulsion to the base must be scraped away, exposing the base for welding.

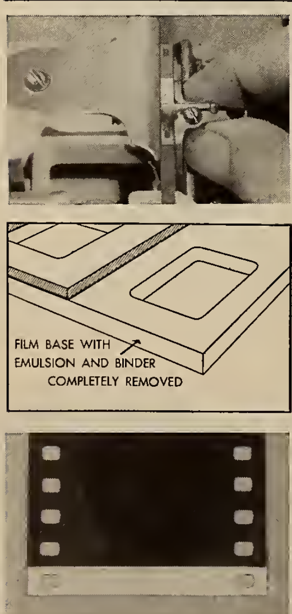

FIGURE 14. Scraping properly done, as above, prepares the surface to be welded, as shown center and below.

The fine wire brush (Figure 12) has proved very helpful. This device may be ordered through theater supply houses. A few sweeping strokes of this brush, after scraping, will give the desired dull surface even though the blade has not been too effective. The proper use of this brush is illustrated in a leaflet furnished by the manufacturer with each unit.

Satisfactory splices demand careful scraping, which means *complete* removal of the emulsion and binder coatings. On certain types of color films where these coatings are on both sides of the film, scraping of each of the surfaces to be joined is required. In all cases, the surfaces to be joined should be thoroughly clean. If the back surface contains only a slight film of oil, some difficulty may be encountered in obtaining successful splices. Sometimes this factor is overlooked and poor splices are mistakenly attributed to the particular cement used, the splicing equipment, or to the film base itself.

Occasionally, it is found helpful to roughen the back surface slightly where certain films seem to resist satisfactory splicing. Another effective technique is to apply a very small amount of cement to the back surface and to wipe it off immediately. This acts as a primer coating preliminary to the actual splicing operation, and aids in obtaining thorough adhesion of the two surfaces to be joined.

The proper type of cement must be used and care should be taken to avoid a great excess. Use just enough to cover the entire area of the scraped surface. It is important to allow sufficient holding time under equalized pressure. For safety film, about 10 to 15 seconds is recommended. At the end of the bonding time, the pressure may be released and the finished splice rubbed slightly with a cloth (across the film; never in a direction parallel to the length of the film) in order to help seal the cut ends.

A good splice is actually a weld, one section of the film being partly dissolved into the other. It should be emphasized that it is important to bring the two surfaces under pressure as quickly as possible after application of the cement. It is undersirable, however, to slam the pressure clamp into position since this results in splashing of the cement. If the left clamp of the bench-top splicer is raised slightly when the cement is applied, a cleaner back surface will be obtained, since the cement will be less apt to flow under the film. This will greatly reduce the possibility of distortion in the spliced area when the cement has dried.

Some exchanges use one type of cement for nitrate film and another type for safety film. This practice has proved troublesome on numerous occasions. Cements are now available which will splice both kinds equally well if instructions are fol-

(*Continued on page* 28)

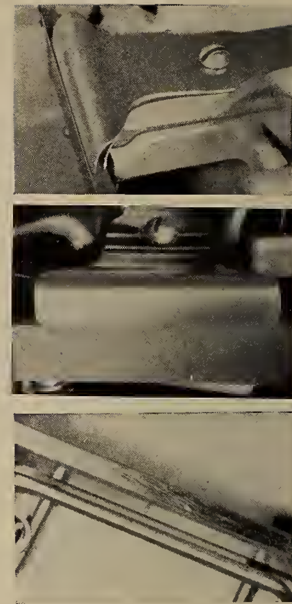

FIGURE 15. The weld must be clamped promptly and kept clamped for sufficient time. Good contact provided by well-adjusted equipment holds the films together evenly.

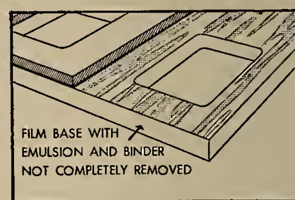

FIGURE 16 Incomplete scraping.

FIGURE 17 Off-center pressure

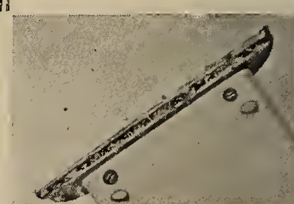

FIGURE 18 Fouled springs

FIGURE 19 Nicked razor blade

FIGURE 20 Incomplete scraping

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Standards Promote Better Projection

Standards are indispensable to the motion picture industry. Herewith is continued IP's presentation of accepted 35-mm projection and sound standards.

II

EVERY 35-mm film, regardless of the studio of origin or manufacturer of the film stock, can be run on motion picture projectors of all makes and types. This is so because both film and projectors conform to accepted standards. All soundtracks, regardless of studio of origin, will today produce sound of standard quality in all theaters when the reproducing equipment has been suitably "tuned."

This was not the case before studio and theater standards had been commonly accepted; and, therefore, in the early days of sound it was made a violation of contract to play "unauthorized" recordings on standard theater equipment or accepted recordings on "unauthorized" equipment.

Today, standards are proposed (after due study) by the Motion Picture Research Council or by the Society of Motion Picture and Television Engineers and submitted for official acceptance to the American Standards Association. Further study follows; also perhaps conferences among those respective organizations; very likely modification of the original suggestion; and eventually the standard may be promulgated not as "official" but only as "proposed." If no serious objections are found or brought forward after a reasonable period of time the proposed standard is ultimately elevated to the status of official.

The *system* of standards, as a system, is useful to all in the industry even in cases where specific standards have never been created. For example, today any 35-mm mechanism can be mounted on any 35-mm soundhead, and the soundhead in turn on any pedestal—the manufacturers on their own account have standardized such details because that is a natural thing to do in an industry where standards are commonly used and universally accepted. In an industry that had no system of standards competitors would perhaps think it a strange thing to build their merchandise for interchangeability with their rivals'.

The accepted standards reproduced here (and in IP for May, 1952) are those that are of direct and immediate interest to projectionists engaged in 35-mm work; standards relating to 16-mm projection will be presented in future issues. Standards not of direct interest to projectionists (such as those referring, for example, to dimensions and perforations of film) will not be presented in these pages. IP gratefully acknowledges the courtesy of the ASA and of the SMPTE in authorizing these reproductions.

Emulsion and Sound Record Positions for 35-mm Film (Z22.3-1946)

1. Emulsion Position

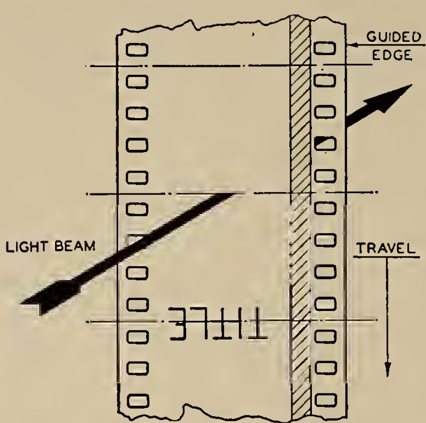
1.1 The emulsion position in the projector shall be toward the light-source except for special processes.

2. Speed of Projection

2.1 The speed of projection shall be 24 frames per second.

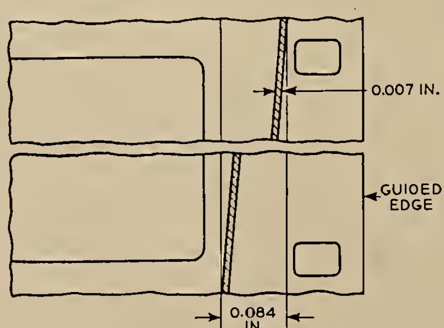
3. Distance Between Picture and Sound

3.1 The distance between the center of the picture and the corresponding sound shall be 20 frames.



Drawing shows film as seen from the light-source of the projector.

Scanning-Beam Uniformity Test Film for 35-mm Sound—Service Type (Z22.65-1948)



1. Scope and Purpose

1.1 This standard describes a film which may be used for determining the uniformity of scanning-beam illumination in 35-millimeter motion picture sound reproducers. The recorded sound track shall be suitable for use in the routine maintenance and servicing of the equipment.

2. Test Film

2.1 The film shall be a print from an original negative. It shall consist of a 1000-cycle, variable-area recording at full modulation of the 0.007-inch width and shall be approximately sinusoidal. The track shall move uniformly 0.077 inch from one edge of the scanned area to the other as shown below.

2.2 The scanned area shall comply with American Standard Sound Record and Scanned Area, Z22.40-1946, and the film stock used shall be cut and perforated in accordance with American Standard Cutting and Perforating Dimensions for 35-Millimeter Motion Picture Positive Raw Stock, Z22.36-1947, or any subsequent revisions thereof.

2.3 The length of this film shall be approximately 8 feet.

1000-Cycle Balancing Test Film (Z22.67-1948)

1. Scope and Purpose

1.1 This standard describes a film which may be used for balancing the respective power-level output from two or more 35-millimeter motion picture sound reproducers.

2. Test Film

2.1 The film shall be a print from an original negative containing a 1000-cycle, variable-area track recorded at 50-percent modulation. It shall be accompanied by a statement of the percent modulation of the incident light in the reproducer. The accuracy of calibration shall be within ±1 decibel.

2.2 The harmonic distortion of the recorded 1000-cycle note shall not exceed 2 percent.

2.3 The sound track shall comply with American Standard Sound Record and Scanned Area, Z22.40-1946, and the film stock used shall be cut and perforated in accordance with American Standard Cutting and Perforating Dimensions for 35-Millimeter Motion Picture Positive Raw Stock, Z22.36-1947, or any subsequent revisions thereof.

3. Instructions

3.1 An instruction sheet, describing the manner in which this film is to be used in various types of reproducing equipment, shall be provided with each film.

Sound Focusing Test Film (Service Type) (Z22.61-1949)

1. Scope and Purpose

1.1 This standard describes a film which may be used for focusing the optical systems in 35-millimeter motion picture sound reproducers. The recorded fre-

quency shall be suitable for use in the routine maintenance and servicing of the equipment.

2. Test Film

2.1 The film shall be a print from an original negative and shall contain a 7000-cycle, sinusoidal, variable-area or variable-density track recorded at 1 decibel below 100-percent modulation. The variation in power output level from the film shall be not more than ±0.25 decibel.

2.2 The sound track shall comply with American Standard Sound Record and Scanned Area, Z22.40-1946, and the film stock used shall be cut and perforated in accordance with American Standard Cutting and Perforating Dimensions for 35-Millimeter Motion Picture Raw Stock, Z22.36-1947, or any subsequent revision thereof.

Dimensions for Mounting Frames for Theater Projection Screens (Z22.78-1950)

1. Scope and Purpose

1.1 This standard specifies dimensions for the mounting frames used for supporting motion picture theater projection screens.

2. Frame Size

2.1 Sizes of frames shall be in accordance with the table below.

2.2 The frame size shall be measured from the inner edge of one side to the inner edge of the opposite side.

2.3 Frames for use with screens of less than 12 feet x 16 feet require 3½ in. minimum clearance on each of the four sides with the minimum clearance increasing as indicated for the larger sizes.

3. Hooks

3.1 Suitable lacing hooks shall be provided on the inner edges of the frames. These hooks shall be spaced on 6$\frac{1}{2}$ in. centers starting at points 3 in. on either side of the center of the four sides of the frame.

Appendix

Projection screens for motion picture theaters are supplied in a variety of materials each of which has its own physical properties. One of these properties is the amount a screen of a given size will stretch after it is laced into a frame. For this reason it may be desired to provide mounting frames with more clearance than that specified in the table. The inside frame dimensions are specified as the minimum dimensions which will give a satisfactory installation when used with an average screen of the corresponding size.

Although frames suitable for mounting theater projection screens may be fabricated from any material of the required strength and rigidity, the following wood structural members are suggested:

For Screen Sizes from No. 8 to 11:
2 x 4 main members with 1 x 3 angle braces at the corners

For Screen Sizes from No. 12 to 19:
2 x 6 main members with 2 x 3 corner braces

For Screen Sizes from No. 20 to 30:
2 x 6 main members with 2 x 3 corner braces and two 2 x 4 vertical center braces spaced approximately 12 feet apart with the addition of a 2 x 6 approximately 12 feet long, reinforcing the spliced main members at top and bottom.

Table of Frame Sizes

For Screen Size No.	Minimum Inside Dimensions of Frame					Over-All Screen Size Width		Height	
	Ft	In.		Ft	In.	Ft		Ft	In.
8	8	7	×	6	7	8	×	6	
9	9	7	×	7	4	9	×	6	9
10	10	7	×	8	1	10	×	7	6
11	11	7	×	8	10	11	×	8	3
12	12	7	×	9	7	12	×	9	
13	13	7	×	10	4	13	×	9	9
14	14	7	×	11	1	14	×	10	6
15	15	7	×	11	10	15	×	11	3
16	16	10	×	12	10	16	×	12	
17	17	10	×	13	7	17	×	12	9
18	18	10	×	14	4	18	×	13	6
19	19	10	×	15	1	19	×	14	3
20	20	10	×	15	10	20	×	15	
21	21	10	×	16	7	21	×	15	9
22	23	1	×	17	7	22	×	16	6
23	24	1	×	18	4	23	×	17	3
24	25	1	×	19	1	24	×	18	
25	26	1	×	19	10	25	×	18	9
26	27	1	×	20	7	26	×	19	6
27	28	1	×	21	4	27	×	20	3
28	29	1	×	22	1	28	×	21	
29	30	1	×	22	10	29	×	21	9
30	31	1	×	23	7	30	×	22	6

New G. E. Lamp Catalog

Incandescent lamps for motion picture projection and exciter lamps for sound-on-film reproduction are listed, illustrated and described in detail in General Electric Co.'s new photographic lamp catalog, just released. Copies can be obtained through local sales districts of G. E.'s Lamp Division, or by writing to Nela Park, Cleveland, Ohio.

Projection lamps listed range from 1500 watts down to 30 watts and deliver light intensities ranging from 42,500 lumens down to as little as 810 lumens. The company's 1,000-2,100 watt 35-mm projection incandescents are not shown in this catalog, but in a companion publication, Bulletin LD 19. One page of the catalog is devoted to exciter lamps; the user, however, is also referred therein to G. E. Bulletin LD 19 for more specific information on exciter lamps.

World Standards for Movies

One set of standards for motion picture equipment and practices throughout the world is the ultimate object that a meeting scheduled at Columbia University, New York, June 9-10th. by the International Organization for Standardization, is intended to promote. The American Standards Association was the host. Twenty-three leading nations, including the Soviet Union, Britain, France, Italy, Czechoslovakia, Netherlands, Switzerland and Belgium had been invited to attend; and ten to fifteen additional nations sent observers.

F. T. Bowditch of National Carbon, vice president of the SMPTE, presided at the world gathering. Chairman of the American delegation was D. R. White of du Pont. Other American delegates included: Joseph E. Aiken, Navy; Paul Arnold, Ansco; Herbert Barnett, General Precision; F. E. Carlson and E. K. Carver, Eastman Kodak; Raymond Davis, Bureau of Standards; Lt. Col. Alphons Dillinger, Army; G. L. Dimmick, RCA; J. K. Hilliard, Altec Lansing; H. J. Hood and D. E. Hyndman, Eastman Kodak; W. F. Kelley, Motion Picture Research Council; Henry Kogel, SMPTE; Dr. W. W. Lozier, National Carbon; J. A. Maurer, J. A. Maurer, Inc.; Boyce Nemec, SMPTE; M. G. Townsley, Bell & Howell; and J. G. Scott, Du Art Film Labs.

Eastman Shifts Personnel

Shifts in personnel announced this Spring by Eastman Kodak Company begin with changes in the identity of company president and chairman of the board, and continue through promotions and advancements of department heads.

Thomas J. Hargrave, president since 1941, becomes chairman, succeeding Perley S. Wilcox, now retiring, who has held that post since 1945. New president is Arthur K. Chapman, general manager since 1943 and vice president since 1941. Donald McMaster, vice president and assistant general manager since 1946 becomes general manager and vice president. Neil S. Kocher, who has been with Eastman for 30 years, is promoted to manage film manufacturing; and Dr. Louis K. Eilers, a veteran of 18 years with the organization, is named assistant manager of film manufacturing. Charles D. Snead is promoted to be manager of the cellulose products sales division.

DeVry Tops Record

All past company records for production of 35-mm and 16-mm projection equipment have now been exceeded at DeVry Corp., President William C. DeVry has made known. Moreover, DeVry expects still further increase in the company's output in the immediate future. Sales of 16-mm projectors to industry, educational institutions and government, and increased export of 35-mm mechanisms, account for the record demand.

IN THE

SPOTLIGHT

FELLOWSHIPS in the John Hay Whitney Foundation are now open to members of labor unions. An item in a recent issue of the AF of L *News-reporter*, Washington, D. C., stated that the Foundation has invited applications from members of labor unions who wish to "pursue leadership training in the field of labor." For further particulars the Foundation may be addressed at 30 Rockefeller Plaza, New York 20, N. Y.

• In appreciation of their untiring efforts on behalf of their fellow members, Fred Thome and Anthony Dente, business representative and first vice-president, respectively, of Local 650, Westchester County, N. Y., were recently awarded gold life membership cards and placques.

Fred Thome has been a member of the IA since October 1920 when he joined Local 453 (Willimantic, Conn.), later becoming affiliated with Westchester County Local 366. In March 1927, when Local 650 was chartered, he was elected its first financial-secretary and served in that capacity until January 1949, when he assumed the office of business representative, which he is currently holding. Thome has held office in Local 650 for 25 consecutive years and is highly regarded by the membership.

Anthony Dente became affiliated with Local 366 in 1925 and he, too, joined Local 650 when it received its charter back in March 1927. Dente has played a prominent role in Local 650 affairs and is popular with his fellow workers. In addition to holding the office of first vice-president, he is a member of the wage and organizing committee.

The presentations were made by Albert Storch, third vice-president of the Local.

• A highlight of the May meeting of the 25-30 Club was the presentation to Harry Mackler, former president, of a gold life membership card in appreciation of the many fine services he rendered the Club during his tenure of office. The presentation was made by Morris J. Rotker, also a former president of the Club.

Mackler is one of the old-line members of New York Local 306 and in past years served the Local in several official capacities—as president and as business representative—in addition to serving on various committees.

• Michael J. Mungovan, business representative of Local 25, Rochester, N. Y. for many years, was commended at the recent Silver Jubilee Convention of the New York Union Label and Trades Department, AF of L, for his 50-year record of outstanding service to organized labor. A standing round of applause greeted Mungovan when he was introduced at the Convention banquet.

• The death of F. P. (Reel) McCoy, 45, secretary of Local 444, New Kensington and Tarentum, Penna., shocked his many friends in the Alliance. He had been under medical observation for the past few months and hopes were held out for complete recovery from his ailment. McCoy was secretary of the Tri-State Association, and of the New Kensington Theatrical Mutual Ass'n.

He is survived by his wife and four children.

• The Massaehusetts Federation of Labor will hold its 66th annual convention at the Statler Hotel, Boston, August 11-15.

• Marvin Bazin, 33, member of Philadelphia Local 307, was recently re-elected to the State (Penna.) Legislature by a majority vote of 14 to 1. Bazin, a Navy veteran of World War II and a graduate accountant, is employed as projectionist at the City Line Center Theatre in Philadelphia. He entered the political field in

Marvin Bazin

1950 and if his recent victory is any indication of his popularity with the voters in his district, Marvin Bazin is on the road to carve a fine political future for himself.

• A large trailer-truck crashed into the car of Albert Diodati, member of Pittsburgh Local 171, several weeks ago while he was driving home from work at the Twin Hi-Way Drive-In Theatre. Although his car was completely wrecked, Diodati escaped any injuries and outside of a pretty bad shakeup he is none the worse for his mishap.

• With a sale of 45,900 copies since it came off the press in July 1951, the "Brief History of the American Labor Movement" is considered among the top best sellers at the office of the superintendent of documents in Washington, D. C. This illustrated history was published by the Department of Labor's Bu-

OFFICIALS OF WESTCHESTER CO. (N. Y.). LOCAL 650 AWARDED HONORS

Fred Thome (left), business representative, and Anthony Dente (center), first vice-president, were awarded gold life membership cards and placques in recognition of services rendered Local 650 during the past 25 years. Albert Storch (right), third vice-president of the Local, is shown presenting the placques to Thome and Dente.

reau of Labor Statistics, has 66 pages and is available at 25 cents a copy from the Supt. of Documents, U. S. Government Printing Office, Washington, D. C. Ask for BLS Bulletin No. 1000.

• A heart attack proved fatal to Russel O'Toole, 45, member of Local 148, Indianapolis, Ind. O'Toole was a district maintenance man for RCA and was stricken while working in a theatre. He was a member of the SMPTE, Tripton Lodge No. 33, F. & A.M., the Eagles, and the Fraternal Order of Police.

• A testimonial dinner in honor of John N. Spearing, business representative of Local 511, Jacksonville, Fla., also marked the Local's 35th anniversary. The double celebration was held last month at the Roosevelt Hotel in Jacksonville, and was attended by top IA officials and many industry leaders. IA President Walsh presented Spearing with a gold life membership card in the Local.

Spearing has been a member of Local 511 since 1915, and has held the office of business representative for the past 25 years. He is also an IA representative, having received the appointment back in 1930 from former IA President Canavan.

JOHN SPEARING HONORED AT PARTY GIVEN BY LOCAL 511, JACKSONVILLE, FLA.

Among the guests of honor at the recent double celebration of the Jacksonville Local were, left to right: IA Pres. Walsh; L. W. Griswold, master of ceremonies; General Sec.-Treas. Wm. P. Raoul, and Spearing.

• It is surprising but true, nevertheless, the number of people who are still unfamiliar with the social security benefits. From time to time we receive letters from readers asking us to clarify certain aspects of this law, and we believe that the following points, which appeared in *Nation's Business,* for October, 1951, will answer many of their questions:

1. It's not automatic. You've got to apply for it.
2. If you wait too long, you may lose money. Monthly payments are retroactive for six months from filing; death benefits are lost altogether unless applied for within two years of death. *Tell your family this.*
3. You, or your family, may have to prove right to benefits. Keep file of birth, marriage, death records, *etc.,* where the family can reach it.
4. You can collect your old-age benefits only if you make less than $50 a month—$600 a year—in covered employment. Most employment is now covered.
5. Unless you own your home *outright,* have other income (rents, royalties, dividends, insurance, *etc.*), you may find it impossible to retire on your social security.
6. The new social security law has increased benefits an average of 77½ per cent; makes retirement worth more than $20,000 *tax-free* (equal to at least $24,000 of taxed income); makes widow's and children's benefits worth $41,000, or more, *tax-free.*
7. New law currently reduces credits needed for benefits. A man of 65 with six quarters of covered employment after 1950 is fully insured. This means many old folks will collect up to $20,000 in benefits by paying $81 in tax.
8. New law gives automatic coverage for armed service during World War II. Anyone who served 18 months (unless dishonorably discharged) is fully insured until at least 1954.
9. Anyone more than 75 may make as much money as he can, even in covered employment, and still collect his social security *tax-free.*
10. The social security people recommend that you check up on your wage credits every year or so, make sure your employer is depositing the tax to your number. Send your account number, name, address, date of birth on a penny post card to the social security administration offices in your city.
11. Visit your local social security office to learn about your benefits.

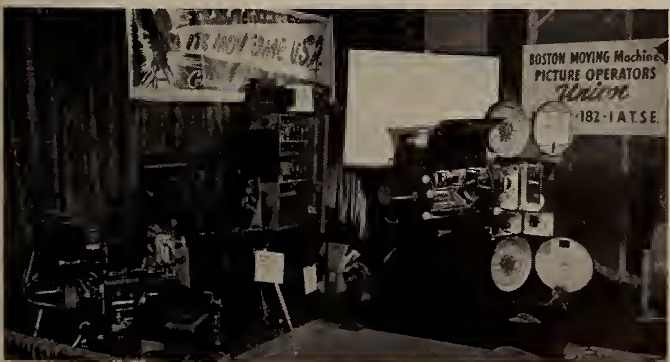
• Eddie Miller, business representative of Houston Local 279, was appointed to the House Committee of Variety Club Tent No. 34, of Houston, Texas.

• We are sorry to learn that Charles Croft, member of Indianapolis Local 194, is ailing at St. Elizabeth Hospital in Lafayette, Ind. He has our very best wishes for a speedy recovery.

• The officials of Local 482, Champaign-Urbana, Ill., successfully concluded negotiations with the management of the Family Drive-In Theatre and union projectionists are back at work there. The Local's contract with the theatre expired in the summer of 1951 and negotiations for its renewal ended when the Local officials refused to cut the manpower. The drive-in was picketed for the balance of the 1951 season, and at the beginning of the 1952 season the theatre management voluntarily offered to renew its contract on the same basis as the previous one, an offer which was accepted by the Union. Today all theatres and drive-ins in both Champaign and Urbana employ Local 482 men.

• A fatal heart attack ended the career last month of John O. Jones, 46, president and charter member of Local 730, Barstow, Calif. Jones also held membership in Local 720, Las Vegas, Nev., and was a delegate to the recent conference of Calif. District Council No. 2.

BOSTON LOCAL 182 EXHIBIT AT RECENT UNION-INDUSTRIES SHOW



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Equipment items shown here are such old projectors as a Powers #5; Optigraph 1899; Edison Projecting Kinetscope 1897, and an Elge Arc Burner, 1903. Modern equipment included a Simplex XL; Strong Trouper Spotlight, and a 16-mm Ampro projector.
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LETTERS TO THE EDITOR

To the Editor of IP:

I would like to add a hearty hear-hear to your "Monthly Chat" column for May. However, I would like also to add a word of gentle criticism concerning the apparent laxity with which some projectionists approach their work.

Twice in the last three weeks I have attended the two local theaters here in Bethesda and in *each* case at a dramatic point in the story the arcs extinguished. In one case sound ran for about sixty seconds before the projectionist became aware there was no picture on the screen. In the other he shut down and started up again.

When I lived in New York the same thing frequently occurred at the neighborhood houses. As long as some projectionists fail to take their work seriously I feel the public will tend to shy away from *paying for* poorly presented shows when they can get them on television for nothing. (The double meaning is intended!)

How about an article in the *International Projectionist* on the Alert Projectionist?

John H. Battison
Bethesda, Md.

Ed note: Readers of IP do not need such an article—proof being that they pay to buy this magazine—while those projectionists who might benefit by the exhortation are just the ones that do not read IP and wouldn't see it. But are you sure the *projectionists* were at fault in the cases you mention? Did you go up to check on the conditions under which they had to work? We have in such instances and more than once found some poor projectionist struggling manfully and hopelessly with antiquated worn out junk of equipment that management refused to spend a penny on either to replace or repair.

We also have wondered why a projectionist took so long to find out his screen had gone blank, and found on visiting him that he was trying to do a two-man job all by himself and could not watch his screen at that particular time because then he was busy rewinding. For the careless projectionist we offer no excuse. We can do nothing about him because we can't reach him. He would neither buy nor read IP.

To the Editor of IP:

Your article "Better Film Care Improves Entertainment" (IP, *April 1952*) was very good, and helpful to the projectionist, but all damage to film is not done by faulty machines in the projection room. Careless methods in the inspection rooms of the exchanges are responsible for much of it. Very often the film is not examined at all. Indeed, one company just seals the reels with labels reading: "Checked but not examined."* Checked! Do they mean they made sure there was a film in the can and not a pair of old shoes?

Why don't the exchanges hire enough help to examine the film properly, and why are the examiners not taught to make lasting splices? Your magazine has repeatedly discussed hairline patches, and proved that they do not hold, yet the exchanges continue to use them.** Why do the exchanges use methods that are obsolete, and why do they not cooperate to save their own film?

RKO has placed stickers on their films which read: "Caution: This is a *new print.* Please be sure that projection machine is in good working order so as not to damage film." This label* in itself is liable to do damage by causing sprocket holes to break, and by making that piece of film stiff and brittle. I have received *old* film bearing the caution described above, and have found it in such bad condition that I could not use the print, and had to return it to RKO for a better one. Ironic, isn't it? Warner Brothers have

(*Continued on page* 32)

Red Cross OK's New Method of Artificial Respiration

A new "back-pressure arm-lift" method of artificial respiration has been approved by the American National Red Cross to replace the Schafer prone-pressure technique that has been taught to Americans for more than a generation. Research teams proved that an artificial respiration method suggested years ago by Col. Holger Neilsen of Denmark, with certain adaptations was twice as effective as the Schafer technique in moving air into and out of the lungs.

Here's how the back-pressure arm-lift method is applied:

The victim is placed on his stomach with arms folded under his head and his cheek resting on the crossed arms. The operator, kneeling at the patient's head, places his hands on the victim's back so that the thumbs touch each other and the heels of the hands are below a line running between the arm pits.

Keeping his elbows straight, the operator rocks slowly forward until his arms are approximately vertical; then he moves backward, slowly sliding his hands to the patient's arms just above the elbows. The operator continues to rock backward, raising the arms of the subject until resistance and tension are felt at the victim's shoulders. He then drops the arms and repeats the cycle 12 times a minute.

The new method helps to force air into the lungs as well as to expel it, where prone-pressure forces air out and relies solely on the elastic recoil of the chest and internal organs to pull fresh air into the lungs.

It is important to continue working on the subject for many hours, if necessary. Persons have been revived by this method as long as 10 hours after their natural breathing stopped. That's why you rest on one knee—after half an hour or so you can shift to the other knee, and keep on working. Even though the unconscious man starts to breathe, the pressure should be kept up for some time, or respiration may fail again.

In the new method of artificial respiration the first step is to lean forward from a kneeling position to apply pressure on the victim's back.

Then the rescuer rocks back, sliding his hands to the patient's arms. The elbows then are raised, pulling air into the victim's lungs.

16-mm

A NEW DEPARTMENT OF IP STARTING THIS MONTH, AND WHICH WILL APPEAR EVERY MONTH HEREAFTER

New Opportunities in 16-mm Projection

Explosive expansion of narrow-gauge activity provides increasing fields of employment for the skilled professional projectionist in television studios and at non-theatrical showings, as well as enhanced possibilities of personal business ventures on his own account.

FOUR factors have united to prod the progress of 16-mm sound projection into what is rapidly becoming an enormous industry in its own right, and one that is opening to skilled projectionists opportunities for employment or personal venture which have at present no visible horizon. It is in a way fascinating that a method and equipment for projection specifically invented and developed for amateur use has so drastically increased the demand for competent professionals. Of the four factors contributing to this result, two have been of slow growth and recent culmination, the third of rapid growth and the fourth explosively sudden.

Growth Factors

One factor of slow growth has been the technical improvement of equipment and procedures to the point where a development intended originally for amateurs now yields both picture and sound of professional quality. It is true that the best 16-mm to date is still not equal to the quality of the best 35-mm; but a great many theater presentations offered to paying audiences today are by no means equal to the best available 16-mm. This improvement in narrow-gauge pictorial and tonal values has not been at all sudden but gradual and very solidly based. Important progress in it has been made since the end of World War II.

A second factor, also of slow growth, has been the steady and relentless pressure of price inflation which naturally stimulated interest in any process that could produce reasonably comparable results at lower cost.

Of more rapid growth, still growing, and promising to expand prodigiously, is the use of 16-mm in television studios. Films are indispensable to TV. Both 35-mm and 16-mm equipment and prints are in use and operated by professional projectionists (an employment opportunity that may in the not distant future almost rival the theater itself). The present trend is strongly in favor of 16-mm for telecasting, as against 35-mm. Narrow-gauge costs less and its somewhat inferior quality as compared with the best 35-mm is unimportant because the quality bottleneck is not in the film or its equipment, but in TV. The pictorial TV bottleneck is the narrowness of the assigned frequency band, which cannot do justice even to relatively poor 16-mm, and the sound bottleneck is the tinny little loudspeaker used in most home sets.

Finally, and of very recent development, is the sudden and extensive addition of magnetic soundtracks to narrow-gauge film. These enormously increase the usefulness and therefore the popularity of 16-mm, because they make possible addition, erasure, or substitution of sound at will, anywhere, to any extent and as often as desired. Sales managers, convention managers, educators and others are naturally far more inclined to make use of film when the sound track is under their individual control, to be molded, modified and manipulated by each individual as he personally chooses.

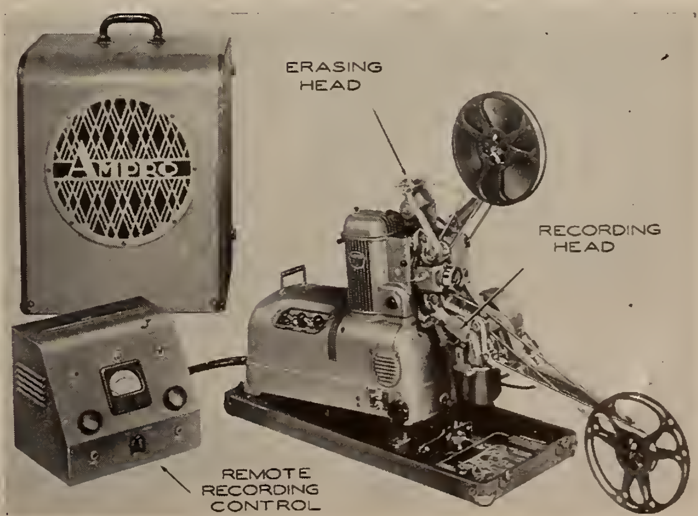
Members of Local 110, Chicago, earned more than $50,000 in wages during 1951 operating 16-mm equipment at conventions, sales meetings and the like. The total wages earned by all members of all Locals throughout the U. S. and Canada has not been tabulated but must be substantial. And this was largely before magnetic sound had been added to increase the usefulness and popularity of 16-mm.

Removal by the government, this spring, of the ban on building more television broadcasting stations is expected throughout the TV industry to result in early launching of hundreds if not thousands of telecasting studios in every part of the U. S.—and it is quite safe to affirm that every one of them will use 16-mm projectors and need competent operating personnel from early morning to late at night.

Projectionists Profit

Personal ventures by projectionists in the field of 16-mm are nothing new. Ever since such equipment became available, back in the 1920's, theater projectionists have owned it, and rented it (and their own services as operators) for commercial showings. The current surge of interest in 16-mm expands the opportunities for such activity.

The skill and competence of the professional projectionist can be devoted to repairing and servicing 16-mm apparatus owned by others but only in the case of some products. Very recent inquiry among manufacturers reveals that some



Ampro Corp.'s latest magneto-optical 16-mm sound projector, with projector proper, speaker, and remotely located recording control set up for operation—recording microphone not shown.

will sell repair parts and furnish service information to projectionists wishing to engage in these efforts, but others will not cooperate in servicing by anyone except one of their established dealers. Still a third group of manufacturers state that they would sell replacement parts to persons other than their dealers at list price while the dealers are granted dealer discounts. Thus servicing and repair work in the 16-mm field offers projectionists only a limited opportunity.

Narrow-Gauge Details

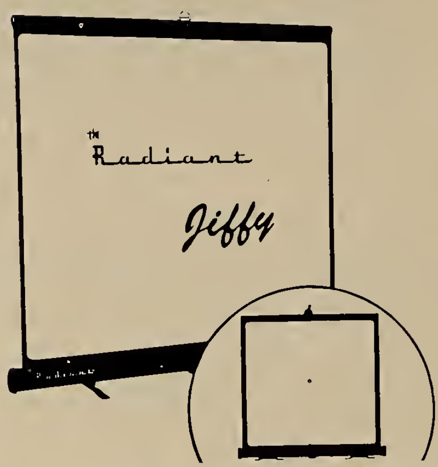
The middle 1920's saw the birth and slowly increasing use of 16-mm. Essential to the entire project was the idea of "safety" film. An obvious proposal at the time was to standardize the new narrow-gauge reels at 17½-mm, exactly one-half the theater width. Alexander F. Victor, founder of Victor Animatograph Corporation, one of the principal manufacturers in the field, states that 16-mm was chosen instead of 17½-mm in order to discourage "a black market in which unscrupulous persons might split regular thirty-five millimeter (nitrate) film" and offer it as safe for home use by amateurs! "It was decided that the new film should be made 16 millimeters in width, which was a millimeter and a half less than a split thirty-five, and with film channels made to a 16 millimeter dimension, it would prevent the use of split theater film."

One current model projector is pictured herewith. Others will be presented in early future issues. Most of them use an intermittent movement of the claw type, in which a two-prong or three-prong claw takes the place of the intermittant sprocket; and is actuated, not by a Geneva cross, but by a pair of cams or some similar arrangement. In general, where two cams are used, one moves the claw toward the film and back and the other (when the claw is engaged in the sprocket holes) moves it downward and thus effects pull-down. Sixteen-mm sound film is perforated along one edge only, to leave room for the soundtrack along the other edge.

SPLICER FOR 16-MM PRINTS

Described as featherweight, simple, compact, efficient, this German-made Siemens 16-mm splicer is built with self-sharpening knife edges and a scraper made of specially developed synthetic material. It has been placed on the American market by Ercona Camera Corporation. A companion piece, an all-aluminum 16-mm editing board by the same manufacturer, is available with it.

RADIANT'S NEW 16-MM SCREEN



New portable 16-mm screen which rolls up like window shade when not in use and is guaranteed by its maker to remain permanently white.

Most 16-mm units are designed from the start with the understanding that they may be operated by very unskilled persons and are equipped with corresponding devices for protection of both equipment and print. In some, the motor stops when a splice breaks or the film moves laterally away from its proper path. In others, special mechanical provisions assure that the sprocket and claw teeth will not damage the film even though it runs over them. Many makers provide permanent threading guides, in some cases in the form of a diagram of the film path affixed within the operating side door; in others a raised line or weal on the main-frame casting traces the actual path and shows the recommended loop size.

Many but not all 16-mm equipments are built to be portable and hence supplied with cables and plug-and-jack connectors; and also tilting devices.

Magnetic Sound

Except for such entirely minor details there is nothing at all about standard 16-mm sound equipment to give any experienced projectionist trouble in operation or more than merely nominal difficulty in maintenance. Just as in encountering any new item of 35-mm equipment for the first time even the most experienced projectionist needs to look it over to check the details of its arrangements, so in encountering any 16-mm model for the first time a check-up of its individual features is in order. However, except for the claw-movement intermittent, nothing very unfamiliar is likely to be encountered in any current commercial model.

The magnetic sound feature, however, is comparatively new, and has as yet had no counterpart in wide-gauge theater practice.

The magnetic soundtrack consists of extremely fine particles of magnetizable iron oxide embedded in a suitable binder. The projector will mount recording and playback heads (likely to be one and the same) plus an erase head. The erase head is an electromagnet actuated by an alternating frequency above the audible range, commonly taken from the super-audible frequency used to light the exciter lamp. This frequency is generated by a vacuum tube oscillator. As the film passes over the erase head its hf ac completely demagnetizes the track, removing any previous record. The track then proceeds over the record-playback head—another electromagnet. If this carries an amplified microphone current a new track will be recorded. In playback, the record-playback head is not supplied with current but instead produces sound current in response to the magnetization of the moving track. Provisions are often incorporated to assure that an established track will not be destroyed accidentally by leaving the erase head active during playback. These provisions make playback either electrically or mechanically impossible as long as the erase head is operative.

By deliberate and intentional use of the erase head a whole track or any selected portion of it can be cleared of previous sound and re-recorded with any message or music desired.

Magnetic erase, recording and playback details differ in the products of different makers, but the principles are always the same and present no basic problem to any projectionist.

16-mm PLASTIC REEL CAN

Eastman Kodak Co. announces this new 16-mm polystyrene plastic film reel can, so completely transparent that the contents are visible at all times and titles written or printed on the contained reel can be read at a glance. The amount of film actually in the can (and approximate running time) can readily be estimated without opening it. It is adapted to 400-foot reels.

Optical-Magnetic 16-mm Sound Projector‡

By G. A. del VALLE and F. L. PUTZRATH*

Heretofore, the task of recording sound on 16-mm film has been a job for the engineer and the most aggressive amateur. With the advent of successful striping of 16-mm film with magnetic coating, synchronized sound with picture is now a reality for a greater number of people. The instrument described herein has been designed to record, reproduce and erase magnetic soundtrack,

EVER since iron oxide coated tapes became an accepted medium for sound recording, the possibility of applying the same material to 16-mm motion picture work has been very evident. Work in our laboratories at Camden for developing and designing equipment to handle this film has been going on for several years.

The projector that we are about to describe is basically an RCA 400 Senior projector (Fig. 1) which has been modified to accept the component parts required for recording and reproducing magnetic sound track without altering, in any way, the characteristic simplicity of its threading.

This projector performs four functions: (1) It reproduces photographic sound track; (2) it erases and records magnetic sound track; (3) it reproduces magnetic sound track; (4) it can be used as a public address system. Any one of these four functions can be chosen by simply turning two knobs, one (Fig. 2) to select the amplifier operation desired, and one (Fig. 1) to select the type of sound track to be played. Recording level is checked by a glow-lamp indicator which is located on the upper portion of the amplifier panel.

For recording and reproducing magnetic track, a very small record-play combination head has been mounted inside of the sound drum. The erase head has been mounted just ahead of the upper sprocket, Fig. 1. The location of the record-play head inside the sound drum offers several advantages over any other location. The constancy of film motion is optimum at this point and the distance from sound to picture can be maintained exactly the same as that standardized for photographic and proposed for magnetic tracks.

In order to obtain maximum tracking of the head against the film, it was found necessary to provide four distinct adjustments for the record play head: azimuth, lateral, pressure and bearing adjustments.

The erase head has also been mounted on a hinged arm but for a different purpose. Perhaps one of the weaknesses of magnetically recorded sound is the possibility of unintentional erasure of the recorded signal. In the RCA 400, rewinding of film is accomplished by merely threading the tail end of the film into the upper reel, tripping the rewind lever, and starting the projector. To render the projector as nearly foolproof as possible, interference was intentionally provided between the rewind lever and the erase head.

In other words, upon completion of a

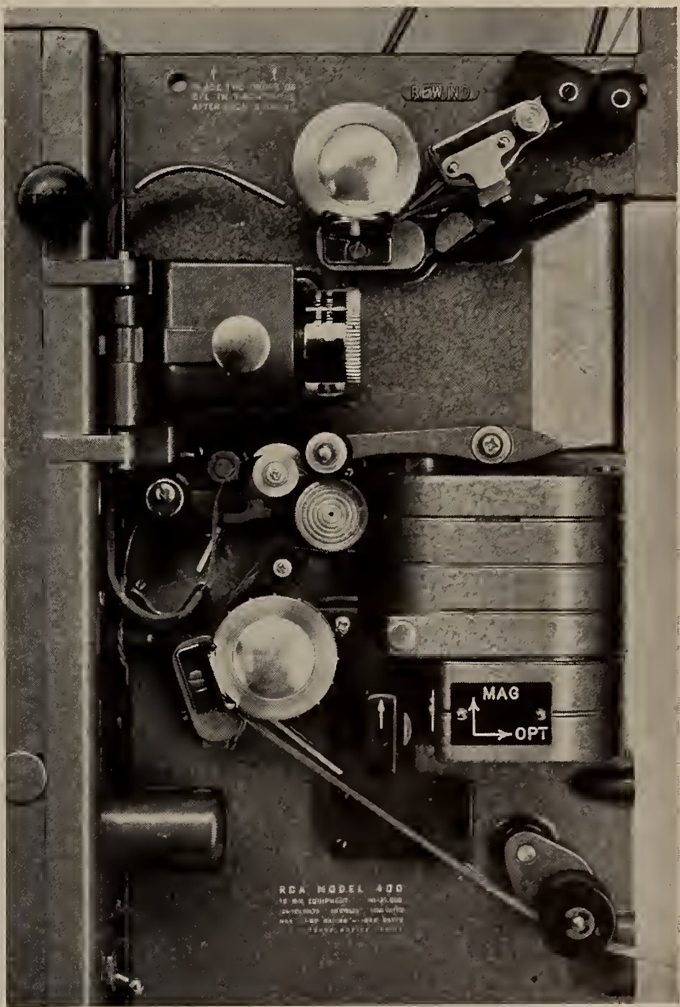


FIGURE 1. Operating side of the RCA-400 optical-magnetic projector showing film path, erase head, rewind lever and track control switch for selection of either magnetic or optical reproduction.

Four-position amplifier function selector switch; off-on switch and sound level indicator lamp just below off-on switch.

‡ J. Soc. Mot. Pict. & Tv Eng. for April, 1952.

* RCA Victor Division, Eng. Prod. Dept., Radio Corp. of America.

recording, the erase head must be moved out of the way to permit the rewinding of the film. This automatically removes the erase head from the film-threading path. One can erase only when the erase head is deliberately pushed down into position and the film threaded through it.

Besides this precaution, it is also necessary to turn the function-selector switch in the amplifier to the *Record-Erase* position and to insert a plug in the input jack. If any one of these last two operations is not performed, the erase head will not be energized. For efficient erasure of the recorded signal, it is also essential that good physical contact be maintained between the sound track and the magnetic gap. For this purpose, we have provided a small plastic shoe with very light pressure which holds the film directly against the magnetic gap of the erase head.

Two guide rollers have been provided ahead of the erase head. These rollers maintain the film at a constant angle as it enters the erase head independent of the reel diameter.

As mentioned before, the projector reproduces photographic track. This is accomplished by merely placing the selector switch (Fig. 1) in the *Optical Sound* position and the track selector on *Optical.* When the track-selector knob is moved to this position, a microswitch completes the circuit for the exciter lamp and at the same time the magnetic head is retracted to prevent it from making contact with the film. These two precautions not only make it mandatory to turn the track-selector knob to obtain exciter-lamp excitation, but also make it impossible to scratch the track as it passes over the magnetic head when reproducing photographic sound.

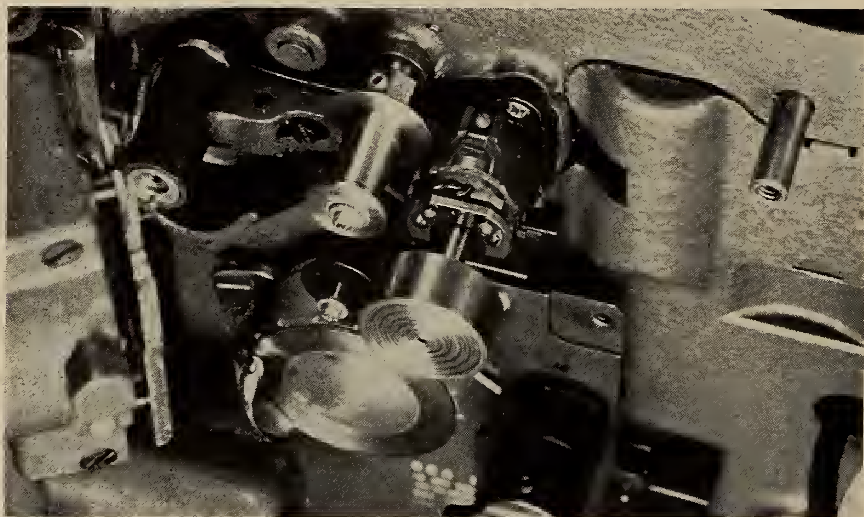


FIG. 3. Sound drum partially removed to show magnetic head assembly.

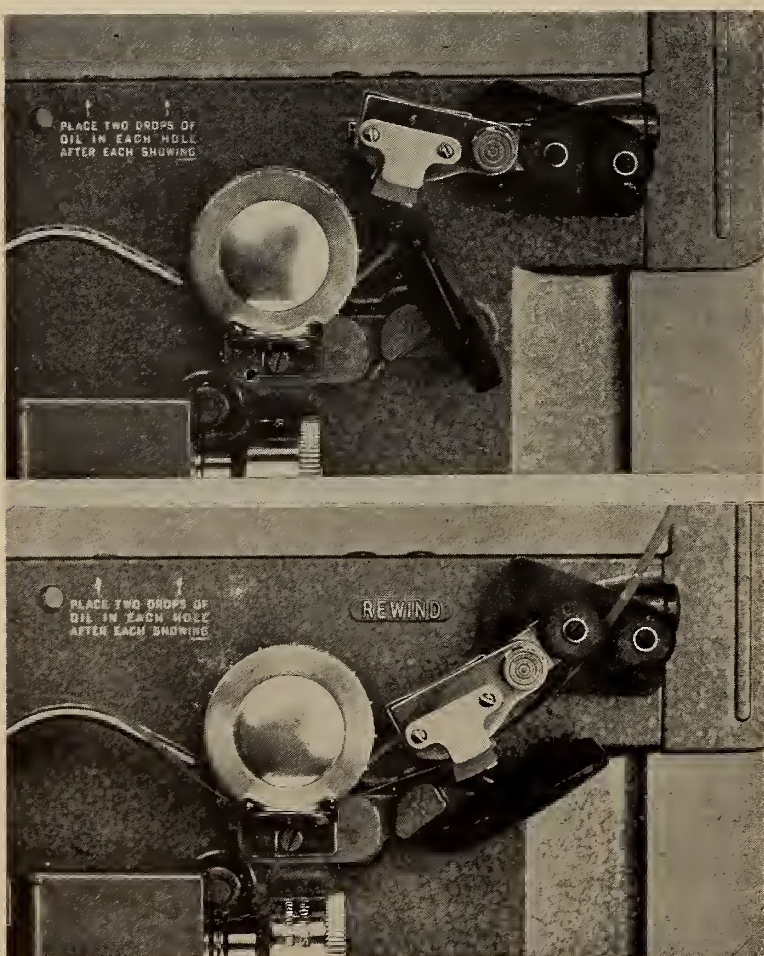


FIGURE 4. Erase head and rewind lever. Upper picture: rewind position with erase head physically shifted to make accidental erasure during rewinding impossible. Lower picture: erase head in operating position. Lubricating holes at upper left in each picture.

The Amplifier

The amplifier described in this article is somewhat similar to the one used in the 16-mm Senior RCA 400 Projector. The new amplifier model (Fig. 5) meets all the performance requirements of the standard projector and, in addition, has all the facilities necessary for the recording, reproducing and erasing of sound on the magnetic-coated film. The modification of the amplifier has been accomplished mainly in two steps:

(1) The gain of the amplifier proper has been increased by substituting a pentode for the former triode voltage amplifier, resulting in the following tube complement: 1—5879 voltage amplifier; 1—6J7 voltage amplifier; 1—6SL7GT voltage amplifier, phase inverter; 3—6V6GT push-pull output stage, rf oscillator; 1—5Y3GT rectifier, and 2—NE-2 voltage regulator, recording level indicator.

(2) A 9-pole, 4-position switch has been used to permit the selection of any one of the previously mentioned projector functions.

For the reproduction of magnetic sound (S2 in position 1) the record-play head is connected to the primary of the input transformer, the secondary winding of which is connected to the grid of the first voltage amplifier. A special load is connected to the plate circuit of the first voltage amplifier giving the required low-frequency compensation. The signal then goes through the regular amplifier path, including the pentode and triode amplifiers with their volume and tone controls, the phase inverter, and the push-pull output stage. The amplifier load is the speaker. To avoid possible erasure of the magnetic film no plate power is applied to the oscillator tube. However, a dummy load maintains a constant load on the power supply.

For the recording of sound on the magnetic film (S2 in position 3) the grid of the input is connected to the microphone. The signal follows the regular amplifier

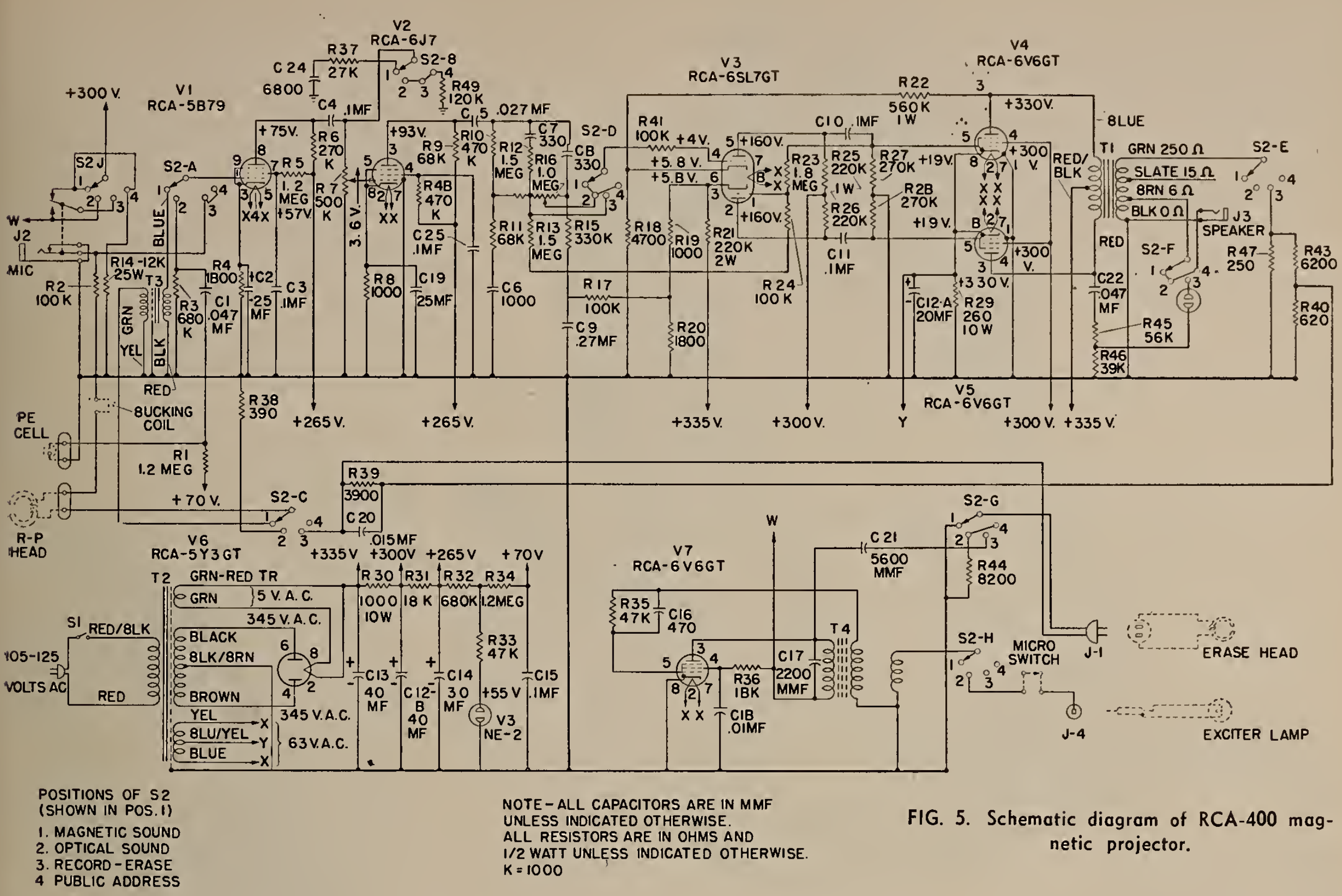


FIG. 5. Schematic diagram of RCA-400 magnetic projector.

path except that the tone control circuit is disconnected, insuring a "flat" recording characteristic. The speaker load is disconnected to avoid accidental acoustic feedback. In its place, a dummy load is connected across a 250-ohm output winding. A suitable voltage divider across this load feeds the record-play head through the compensation network (R-39 and C-20).

In order to avoid accidental erasure the oscillator receives plate power only while a microphone plug is inserted. The oscillator load is connected from the primary side of the transformer and is formed by a series-parallel combination of the erase head, the record-play head, C-20, R-39 and R-40. Thus, the mixing of the audio and biasing currents for the record-play head occurs between the head and the compensating network. The switch section which was used to disconnect the speaker load now completes the circuit of the recording-level indicator, an NE-2 tube. The resistive network associated with this indicator is adjusted so that the indicator flashes at a signal level slightly below the overload point of the film.

Magnet Bias Control

In order to avoid distortion and high hiss-level, it is imperative that no residual magnetism be left in the record-play head. Thus, means must be provided to decrease the bias current in this head to a small value before it is entirely removed.

In this model a step-by-step bias attenuation is accomplished automatically when the amplifier is switched from the magnetic recording position. In particular, S2-J (being a shorting-type switch) temporarily parallels the oscillator tube and the dummy load that otherwise takes its place. Thus, a reduction in B-supply voltage is effected, decreasing the recording-head current. S2-G and S2-H (also of the shorting type) temporarily load the oscillator tank primary and recording windings with R-44 and the exciter lamp respectively also effecting a decrease in bias current.

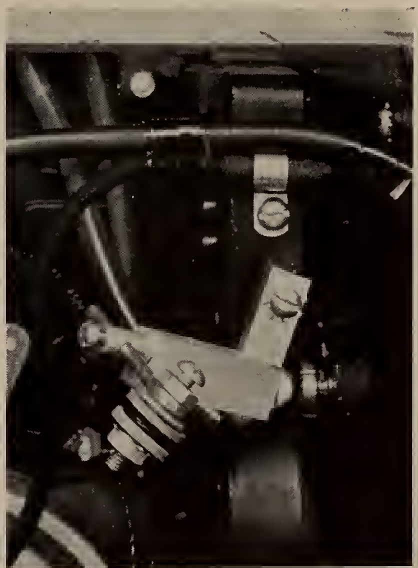


FIG. 6. Hum-canceling coil located on the main frame of the projector.

Similarly S2-C shunts the record-play head with R-38. Since these means of reducing the bias current in the record-play head will occur successively in some random sequence, the head will be left in an essentially de-magnetized state at the time when the biasing current is completely removed. If the microphone jack is removed while S2 is in the *Record-Erase* position, the capacities associated with the oscillator will permit exponential decay of the amplitude of oscillation.

Hum Elimination

Residual hum is eliminated by the use of a hum-bucking coil in series with the record-play head. It was not possible to obtain a single minimum hum-bucking coil adjustment for the two conditions of projection lamp "on" and "off." However, a compromise coil position was found which gives satisfactory overall performance.

The performance of the electrical system may be summarized as follows: Since the output stage of the amplifier remains essentially unchanged, the power output rating is identical to that of the

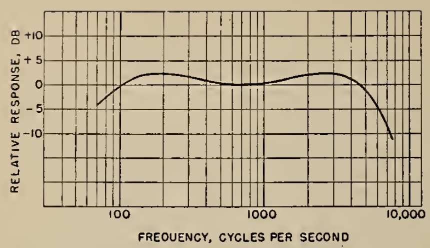


FIG. 7. Overall frequency response of the system for a signal recorded and played back.

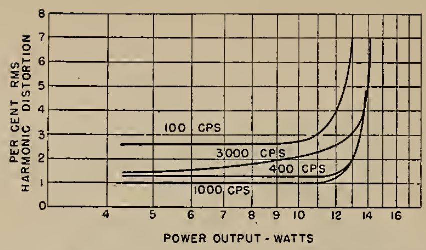


FIG. 8. Distortion curves of the amplifier at different frequencies.

original amplifier. Also, overall characteristics of the amplifier for optical playback and public address remain unchanged.

During magnetic recording, it is possible to have 35-db attenuation in the volume control before the input stage overloads. The amplifier output networks are adjusted so that the amplifier distortion will always be small compared to that of the recorded signal. Thus, optimum signal-to-noise ratio is obtained during recording.

With modulated film, the amplifier has approximately 15-db gain reserve during playback. Under these conditions, the signal-to-noise ratio is 50 db with the tone-control in the flat position. The overall frequency response of the system, for a signal recorded and played back on this projector, is flat within 5 db from 100 to 6000 cycles/sec.

General specifications of the RCA 400 are given in Figures 7 and 8; Figure 9 shows the complete unit.

One particular advantage of magnetic recording is that the sound track is independent of the film emulsion or developing processes. Sound can be added either before or after the film has been developed for picture, resulting in great flexibility of editing. Lip synchronization can be obtained in a few trials.

Besides the conventional method of recording sound on a standard 100-mil track, some variations have been tested which present decided advantages for certain applications. For example, half of the width of an optically recorded track can be coated with iron oxide material. Although the output of both tracks is cut by 50% and their signal-to-noise ratio decreased, great practical advantages can be realized. For instance, the tremendous wealth of knowledge that has been accumulated in this country in instructional 16-mm films can be released immediately to our friends overseas. They in turn can make their own translations and recordings at a very nominal cost per print. This is but one of the many possible applications of a 50/50 track.

The cost of producing sound on 16-mm film with this multi-use equipment has been estimated to be about one-third of the cost of achieving comparable results photographically. In addition, film waste due to recording errors is eliminated.

DISCUSSION

Loren L. Ryder: In the interest of standardization with respect to frequency characteristics, I wonder if you are in a position to make available the frequency characteristics of this recorder-reproducer at this time. It may be to the advantage of all if at an early date there is a semblance at least of standardization so that the product to be reproduced on your equipment or handled with other equipment might be interchangeable. Is that information available?

O. B. Gunby: Since the authors of this paper aren't here and detailed information on the frequency characteristic is not available at the present time, your question will have to be referred to them. However, I have a slide here that shows the frequency response used in making this demonstration film.

Lloyd Goldsmith: Speaking as chairman of the Sound Committee for the Society I'd like to report that our Subcommittee on Magnetic Recording is attempting to stand-

(*Continued on page* 29)

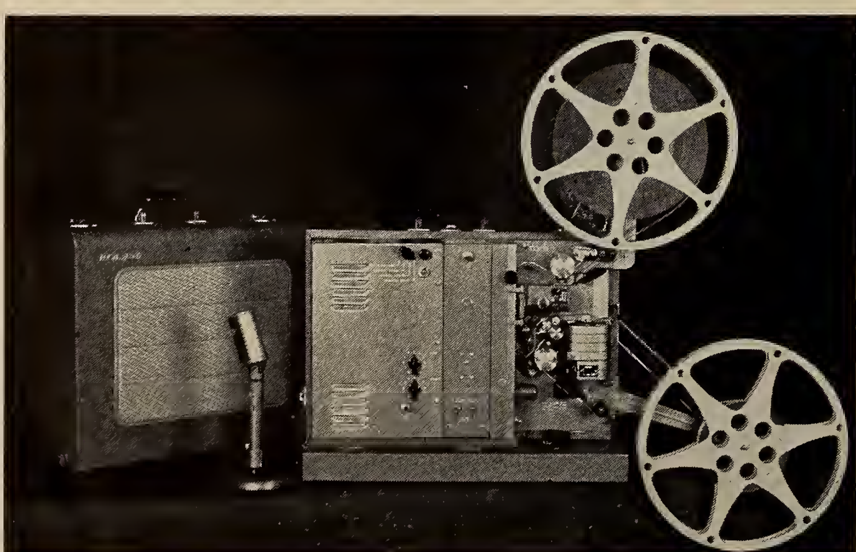
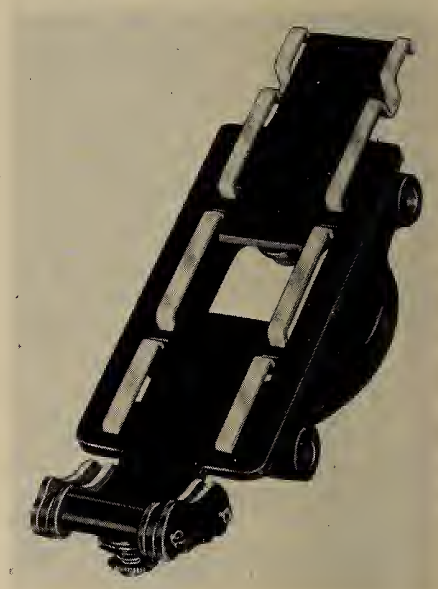


FIG. 9. The RCA-400 magnetic projector ready for operation.

LaVezzi Improves Film Trap



Steadier projection, less wear and fewer interruptions are advantages claimed for this new Simplex-type film trap, developed by La Vezzi Machine Works for Simplex and Super-Simplex type mechanisms. The pads (as in more modern projector models) have been extended to cover practically the whole length of the trap. Centrally located conical tension springs, also a feature of more modern mechanisms, have been provided to assure equalized and adjustable pad tension. The intermittent sprocket film guide at the lower end of the trap is similarly provided with a centralized conical tension spring adjustable by turning a knurled nut. Stop studs control the spacing between closed trap and the film guide tracks.

Projection is steadier because the film is under tension throughout a greater portion of its length; wear on both intermittent sprocket and film is lessened because the tension, being adjustable, need never be excessive; and possibility of interruption is reduced because correct tension, equal along both edges, is less likely to tear patches. The trap part number is E-78-L for standard mechanisms and E-78-LS for Supers.

TECHNICOLOR

(*Continued from page* 9)

such becomes relatively more important among the factors that make up the complete attractiveness of the picture. Therefore scratches and flaws in the print, whether caused hy dirt in the film path, misalignment, overworn parts, or faulty threading, are relatively more harmful than in black-and-white. Additionally, they impair a more valuable article since Technicolor prints, which must go through a more elaborate process of manufacture, necessarily cost more to replace when damaged than do black-and-whites.

Screen illumination level is also important; the density of Technicolor prints is so controlled as to produce the most satisfactory image when the light falling on the screen is approximately 12 to 14 footcandles, with normal carbon trim and shutter action, but no film threaded in. When such illumination falls on a clean, flat, white screen, the resultant brightness is satisfactory for best viewing of Technicolor prints.

Producers in Hollywood are aware as never before of the color ingredient in the success-formula. On this point there can hardly be a better yardstick than the activity of the Technicolor Motion Picture Corp. laboratories. Dr. Herbert T. Kalmus, president and general manager, in his message to stockholders accompanying the annual financial report for 1951, disclosed that 76 feature pictures were produced in that year in Technicolor as against 70 in 1950, and 45 in 1949, and exactly 2 in 1932. Hollywood's conviction that Technicolor spells good box-office is sufficiently evidenced by these figures.

By applying his skill and knowledge to secure the aforementioned conditions during every reel of every Technicolor showing the projectionist will be doing his part in the overall cooperative effort necessary to create that pleased and satisfied patronage whose willingness to return is all-important to the theatre's prosperity and even to its survival.

IA ELECTION

LOCAL 182, BOSTON, MASS.

Joseph Nuzzolo, *pres.;* Bernard J. Lynch, *vice-pres.;* Joseph Caplan, *treas.;* Leon A. Narbut, *fin.-sec.;* James A. Gibbons, *rec.-sec.;* Walter F. Diehl, *bus. rep.;* Morris A. Goldman, Ralph Frazier, William C. Dwyer, *exec. board;* Jack Rosenberg, *trustee;* William Kaitz, Henry Perry, Fred S. Jones, Alex Tradd, Patrick Kelly, *sen. board;* J. Nuzzolo, B. Lynch, J. Caplan, W. Diehl, *del. to IA Convention.*

INSPECTION, SPLICING AND CARE OF FILM

(*Continued from page* 14)

lowed. It is important to use fresh cement. Bench bottles should be cleaned out regularly and filled with new cement.

Poor splices attributed to the particular brand of cement being used, or the characteristics of the film, may in most cases be explained by lack of attention to details covered in the above paragraphs. Helpful hints on good splicing and splicing faults are given in Figures 13-23.

Film Deformation

Motion picture film is similar to other plastic materials in that it has certain physical limitations. Distortions can occur through improper storage, through faulty handling and under very severe projection conditions. The various types of distortion are commonly referred to by exchange inspectors and theater projectionists alike simply as "warping" or "buckling." It may happen that the exchange is at a loss to understand the problems encountered by the projectionist because the description of the condition of the film has been inadequate. Likewise, conditions correctly described would help the laboratory locate the source of the difficulty. A uniform terminology pertaining to different types of film deformation will be of great assistance in locating the causes of such deformation and in eliminating further trouble. Some of the most common forms of deformation are illustrated in Figures 24-27.

FIGURE 21 Tilted springs

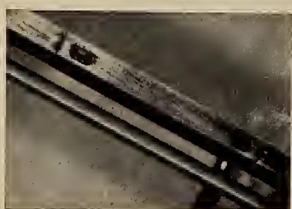


FIGURE 22 Cement-etched scraping surface

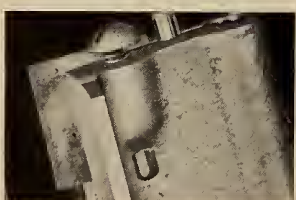


FIGURE 23 Dull scraper

BUCKLE: This type of distortion may be either temporary or permanent. *Temporary buckle* results from loss of moisture from the edges of the film when rolls are stored under dry air conditions. *Permanent buckle* is caused by loss of solvent from the edges of the film when rolls are stored in moist air.

EDGEWAVE OR FLUTE: This type of deformation may also be either temporary or permanent. *Temporary edgewave or flute* may occur along both edges as a result of elongation of the edges relative to the center of the strip during early storage under moist conditions. *Permanent edgewave or flute* may occur along one edge if the roll is wound under high tension.

TWIST: This effect is produced in new prints by loose winding of the film emulsion side in, under dry air conditions. If the film is wound emulsion side out under the same conditions, the undulations do not alternate from one edge to the other as shown in Figure 26, but are directly opposite one another.

CURL: This type of deformation is caused by dimensional differences between the emulsion layer and the support. It results from changes in moisture content of the emulsion layer and support with variation in relative humidity.

SPOKING: This type of distortion is caused by loose winding of film which has a high degree of curl. *Permanent spoking* is seen as *twist* when the film is unwound. *Temporary spoking* disappears when the film is unwound.

EMBOSSING: This is a type of deformation which often occurs when prints are projected with high intensity lamps. The excessive heat causes actual expansion of the picture area, and the frame stands out in relief. This distortion has no detrimental effect on the screen image quality.

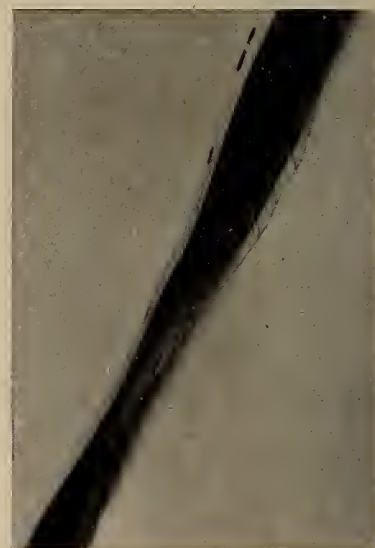


FIG. 26. *Film Twist.* An extreme flute or edgewave extending all the way to the center of the film. Waves thus alternate from edge to edge.

FIG. 24. *Film Buckle.* This is the condition that exists when the edges of the film are shorter than its center section. (Opposite of Fig. 25).

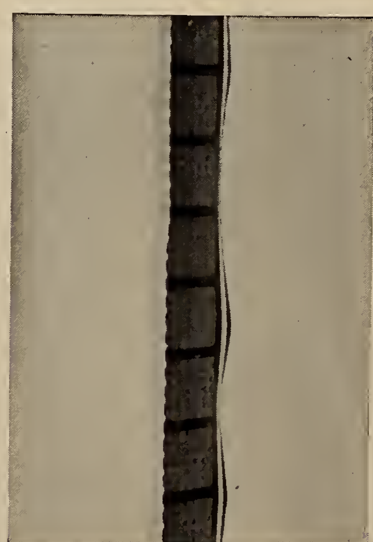


FIG. 25. *Film Flute.* Also called *Edgewave.* Condition that exists when edges are longer than film center section (Opposite of Fig. 24).

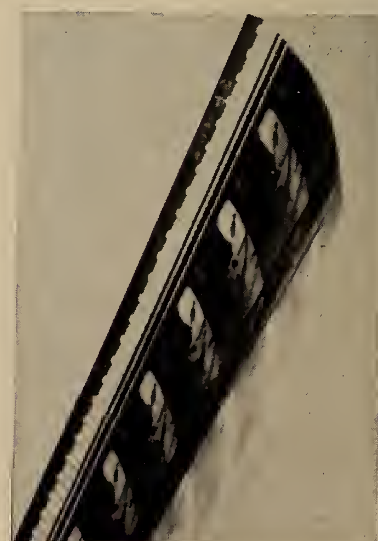


FIG. 27. *Film Curl.* When one surface is shorter than the other. With emulsion side concave the curl is positive; in reverse case, negative.

OPTICAL-MAGNETIC 16-MM SOUND PROJECTOR

(*Continued from page* 26)

ardize, or at least act as a clearing house for information on the frequency response and the pre- and postequalization in these magnetic recorder-reproducer projectors for the benefit of all. Accordingly, Glenn Dimmick has already circulated this information to the Subcommittee with respect to the RCA projector and I will be very glad to make it available to Mr. Ryder. Also, Ampro has indicated their division of pre- and postequalization, and I'm sure that before very long there will be agreement on recording-reproducing characteristics to allow complete interchange of magnetic film made on this type of projector.

Mr. Gunby: The slide is now ready for presentation. You will notice that it gives only the overall frequency response. It probably doesn't completely answer Mr. Ryder's question, but the information referred to by Mr. Goldsmith, which can be obtained from the Subcommittee on Magnetic Recording, will likely provide the additional data requested.

16-mm Flourishes in Britain

Approximately 36 permanent theaters and 1,000 mobile units show an estimated 300 feature films over commercial 16-mm equipment in the United Kingdom each year, according to Nathan D. Golden, Director of the Motion Picture and Photographic Products Division of the U. S. Department of Commerce.

Golden, reporting from the U. S. Embassy in London, reveals that five main companies distribute American and British entertainment features in 16-mm versions; the principal company engaged in this activity being one owned by Britain's leading 35-mm tycoon, J. Arthur Rank. Additionally, film libraries rent out 16-mm versions of imported and domestic 35-mm features, Golden's report discloses.

The 36 permanent 16-mm theaters are in general located in rural areas remote from 35-mm enterprises. They are less stringently regulated than 35-mm theaters, particularly with reference to the welfare of juvenile patrons; but a bill pending in Parliament proposes to put 16-mm and 35-mm enterprises on equal footing.

New Radiant 16-mm Screen

A new portable, demountable, 16-mm matte surface screen is announced by Radiant Manufacturing Corp. It weighs 6 pounds, measures 3′ x 3′; can be used on tables or desks by means of a collapsible supporting arm or suspended from a wall; and when not in use it rolls up like a window shade into its protective case. The manufacturer represents that the surface is washable, and will not peel, crack or rot. Permanent whiteness is guaranteed.

Victor Has New Model

Victor Animatograph announces a new model 16-mm sound projector suited to use with audiences up to several hundred in number. Projection lamp is 750 watts, sound output rated at 4 watts. Designated Model 60-4, this latest Victor is light in weight and includes the standard Victor features such as safety film trip, 180-degree swing-out lens mount and large drive sprocket, among others. Operating speed can be set at either 16 or 24 fps; price varies between $417 and $395 according to whether 12-inch or 9-inch speaker is preferred; provisions for plugging in microphone or record player are incorporated.

RCA Promotes Bradford

C. M. Odorizzi, operating vice president of RCA Victor Division, announces promotion of C. V. Bradford to be manager of the company's East Central Region with headquarters in Cleveland. Bradford is a veteran of 20 years service with the company, working in various sales positions and as an expediter in the Middle West, New England and New York. He is a native of New England, and was educated at Northeastern University in Springfield, Mass. The Region of which he is now manager comprises all of Ohio and substantial areas of Michigan, New York, Pennsylvania and West Virginia.

New Splicer for Exchanges

Too expensive for the average theatre but claimed by its maker to be economically ideal for film exchanges, an automatic splicing machine known as Presto-Splicer joins nitrate or acetate film in butt-welds, without overlaps, and without need for skilled labor. Its maker is Prestoseal Manufacturing Corp.

Any exchange worker can produce perfect results with the Presto-Splicer, and the join thus made has approximately 90 percent the strength of the film itself, according to Prestoseal's Leonard Herzig. Since the joint is butt-weld (end to end) with zero overlap, chances of the splice catching or tearing in the projector are enormously reduced, Herzig explains, and the resultant saving in film damage, as well as the fact that completely unskilled labor can be used, abundantly repays a film exchange for the relatively high first cost of the device, he asserts. The theatre, which does not own the film, and which is staffed with projectionists, not film inspectors, is not similarly situated with reference to the cost of the Prestoseal Splicer; but where this is used by the exchange the theatre benefits indirectly in the fact that prints supplied come with stronger patches less likely to tear.

Produces End-to-End Weld

Action of the splicer is to produce a true weld, comparable in principle to a soldered butt-weld between two strips of metal. As the film is placed in the splicer and the appropriate lever lowered it is so cut that the two ends to be joined abut each other only a slight fraction of an inch apart. Operation of the film-cutting lever also applies a "flux"—a plasticizer—to the cut edges that are to be joined. A clamping lever is lowered to hold the film-ends rigidly in place and heat is automatically applied. After the specified number of seconds the film is released and the cut ends are found welded together; the splice is complete; the film ready for use.

Scraping cannot be done poorly, because there is no scraping; too much or too little plasticizer cannot normally be applied because normally the correct amount is applied automatically. The splicer must be operated according to instructions for the type of film to be joined, but the instructions are such that the operator needs only attention and obedience to follow them, not skill.

The identical splicer can be used for both 35-mm and 16-mm prints by changing heads; an operation needing no tools and less than a minute of time.

Although novel to the motion picture field, Presto-Splicer is not new; it has been used for several years for splicing microfilm records.

IA-IP 'HAM' AWARD WINNER HARWOOD

John Harwood, W8VDP, Local 160, Cleveland, has been in show business since he was 10 years old and in radio since he was 14. When Harwood was 10 the projectionist at his father's theatre was Frank Masek, now a charter member of Local 160, a gold-card holder and a member of the staff of National Theatre Supply. Masek taught the 10-year-old Harwood to run the Powers projector while he, Masek, "wooed his wife-to-be out in the balcony, hi." In 1920 Harwood, then at the ripe age of 14, built crystal sets for himself and his friends. In 1928 he was operating projection rooms under jurisdiction of Local 160 both at the local theatre and at the local high school. During World War II he served with the Signal Corps.

George Eastman's First Camera

IN 1888 George Eastman invented a simple box-camera which he named the "Kodak." It was already loaded with enough "American film" for 100 exposures when you bought it for $25. Anybody could operate it. You simply pulled a string (to cock the shutter), pressed a button (to release it), and turned a key (to wind on fresh film). After 100 exposures had been taken, the entire camera was returned to the factory where the film was processed, and prints made from it. The Kodak system was a combination of a simplified camera, roll film, and processing service, and it was at once a great success.

Most of the steps leading up to the Kodak system are well known: Eastman's plate-coating machine, negative paper, stripping "American Film," and roll holder. But the camera which he first designed is something of a mystery. Intensive search has failed to turn up an example, yet before the Kodak camera was even announed, at least 40 "Detective Cameras" were sold.

Details of First Camera

Full details about this elusive camera may be read in the specifications for U. S. Patent No. 353,545, granted Nov. 30, 1886, to George Eastman and Franklin M. Cossitt. The accompanying drawing shows that the camera was outwardly the leather-covered box which had already become familiar to the American public.

Inwardly, it was fitted with a most unusual shutter. A hollow, truncated, triangular prism of sheet metal was pivoted inside the camera box. The open base faced the lens. During exposure, the apex of this funnel-like device traveled across the sensitive material: bit by bit the image of the lens was received by the plate or film. In a sense this was a focal plane shutter. For time exposures, the upper and lower parts of the prism—the jaws, Eastman called them—could be separated. The camera accepted either a roll holder, for enough negative paper for 48 4 x 5 negatives, or holders for glass plates.

First Shown in 1886

A search through George Eastman's correspondence reveals that a model of the Detective Camera was first exhibited at the St. Louis Photographic Convention in June, 1886. He ran into production difficulties almost from the start. "We have been the victims of annoying delays," he wrote on November 17. "We have been unable to get the special form of brass rod for the double holders which are to be used with the camera. We have about 75 cameras nearly done which are waiting for the holders. We do not want to send any out until we are sure that the holder can be put into each and every one without fitting."

A year later, in May: "The price of the Detective Camera is $45." By June the first 50 were completed to Eastman's satisfaction. In January of 1888—the year of the Kodak—Eastman offered W. H. Walmsey, a Philadelphia dealer in photographic goods, 40 of the cameras at $33.75 each for sale at $50. "We shall not make any more of them," he wrote, "owing to the expense, there being no probability of our being able to make anything on them in any quantity. We therefore want to get rid of these without distributing them all over the country. Can you not make a specialty of them?"

In September the new Kodak camera, of much simpler construction, was put upon the market. In its design, Eastman learned much from his experience with the ill-fated Detective Camera. In outward appearance it was the same. But instead of a removable roll holder for American Film, spools were built in. The clumsy internal shutter was replaced by one of an equally ingenious design:—the lens assembly was surrounded by a tube with two holes in it which revolved when the familiar button was pressed; as the holes passed across the lens, the exposure was made.

It is hard to believe that of the 40 cameras sold to Walmsey, not one now exists. The exhibition of photography at the George Eastman House, Rochester, cannot be considered complete until an example of this 1886 Detective Camera is found.

Fresno Theatres Install TV

Two Fresno, Calif., theaters have installed large-screen television—the Paramount, 2646 seats, and the Warner, 2169 seats. The latter is the sixth Warner theater in California to be fitted with large-screen TV; the others being in Hollywood, Huntington Park, Los Angeles, San Bernardino and Santa Barbara.

RKO Earns 334 Thousand

Consolidated net profit for one year of operation of RKO Pictures Corp. was $334,-627, President Ned Depinet reveals. Spring, 1952, grosses have been larger than those of the same period for 1951, Depinet added, but have been less profitable.

LETTERS TO THE EDITOR

(*Continued from page* 20)

the honesty to tell you that they are not inspecting the film and RKO tells you they are sending you a new print—which isn't new.

The projectionist replaces worn parts of his machines to avoid breaks and damage to the films. Why do not the exchanges do their bit by replacing damaged reels and damaged cans to help save their own films? Four-reel cans are much too heavy to be handled properly by delivery men or the young help in the theaters. The result is that these cans are thrown off and on the trucks, become bent, and crush the films inside. Crushed reels of film cannot be extricated without the use of tools which cause further damage to the film.

Films are delivered to the projectionist with leaders in such bad condition that it is impossible to repair them. Why are these leaders not replaced by the exchanges? Very often films arrive without any leaders. Where do we get new leaders for these films or replacements for the torn ones? I take them from trailers or from prints which have extra long leaders or tails, and I do not hesitate to use the property of one exchange to mend the property of another. A little co-operation here would result in money saved for the exchanges.

Can't the officials of the IA or of the various locals take up this matter with the exchanges, and ask that the inspection of films be done properly, and that repairs be done by competent workers? It would do much to ease the life of the projectionist who is always blamed for every stoppage which occurs in a show. Very often the blame should be placed squarely on the exchanges.

M. H. Winton
Kimball Theater
Yonkers, N. Y.

* A sample of this label accompanied Mr Winton's letter.
** With his letter Mr. Winton sends some horrible examples of such patches.

To the Editor of IP:

Many previous writers have stressed the need for even rewinding onto exchange reels. If the film is not evenly wound the protruding edges become damaged when the reel is forced into a bent shipping tin. For some unknown reason exchanges still continue to use reels and tins years after they should have been in the scrap heap. With such reels it is practically impossible for the projectionist to do justice to the film that is in his care.

However, since we are forced to use these old reels, we have to make the best of it. A good job of rewinding can be done on these reels if we use an idler roller to guide the film as it goes onto the reel. The construction of such an idler roller is very simple and any projectionist handy with tools can make one for a few cents.

I have made such an idler. A wooden base block measuring 4½" long, 2" wide and 1½" high is permanently bolted to the rewind bench. At either end of this base block is a hole taking a ¼" bolt. By means of this bolt, a washer and a wingnut, an idler bracket can readily be fastened to either end of the base block. The bracket, which is steel, measures 3¾" high. It mounts a 3/16" stud ½" below the top. A flanged idler roller, which may be either hardwood or bakelite, rotates on this stud. My roller is 2" inside diameter with a ¼" flange.

When this home made assemblage is aligned and bolted down to the hand rewind base and the film threaded under the flanged idler roller on the way to the takeup reel, the tension of the film between the two reels will hold it in the idler roller groove and the idler roller will guide it onto the takeup reel evenly, with no edges sticking out to be damaged by insertion into a warped shipping can.

The roller bracket and roller are easily removed from the base block by taking off the wing nut. For rewinding 1,000 foot reels they should be mounted on that end of the base block that is nearest the takeup reel; for 2,000 foot reels at the opposite end of the base block. Before beginning to rewind, each takeup reel must be checked for wobble. If its edges rub against the film they should be bent outward so as to clear it all around, giving the film a free path. It will then wind up evenly under the guidance of the idler roller, and after rewinding is completed the reel edges can be bent back against the even roll of film.

J. G. Jackson
Capitol Theater
Port Alberni, B. C. Can.

SCREEN TYPES

(*Continued from page 6*)

ous disadvantage, too. Every tiny dent, wave, or wrinkle in the screen is very conspicuous. Beaded screens are much less bothersome in this respect.

Reflecting Angles

Aluminized screens reflect most of the light rays at an angle which is equal and opposite to the angle formed by the incident rays. In other words, these screens have a pronounced tendency to reflect light in somewhat the same manner as ordinary flat mirrors. For this reason aluminized screens should not be used in theaters having steep projection angles. If the projectors are directed downward at an angle of 20 degrees to a perpendicular extended from the center of the screen, most of the light reflected will pour down into the front rows of seats. Patrons occupying other seats will not be able to see a sufficiently bright picture.

Beaded screens, although specular, direct most of the light back along the same path from which it came. When steep projection angles are used with beaded screens, patrons in the balconies, not those seated down front in the orchestra, will see the brightest picture.

As a rule, theaters having steep projection angles and high balconies, and those having seats outside a 25 or 30 degree viewing angle from the normal, should avoid the use of specular screens. And they should never in any case be considered as substitutes for H.I. arc-lamps.

The average theater auditorium, therefore, requires the matte type of screen.

Surface Texture

The fourth important characteristic of screens is the texture of the reflecting surface. As a rule, the surface of the matte screen should be hard and reasonably smooth, though not so smooth as calendered cardboard. Unsatisfactory projection may result if the screen surface is of a very loosely woven, fuzzy, or felt-like texture.

The effect of different textures on the appearance of focused images may be demonstrated in the following way:

Using an ordinary magnifying or reading glass, focus the image of a distant object—a building visible through an open window, for example—upon the hard, smooth surface of a white card. Note the clarity of the image and the fine detail which may be present in the inverted image.

Now substitute for the card a cotton handkerchief. Observe that the finest detail is lost, and that the image is not so sharp as it was on the card. Repeat with a coarser material such as white felt or white woolen material. It will at once be seen that pictorial detail and contrast values have seriously deteriorated. The loose fibers scatter light through the material and fog the focus.

Light Scattering Phenomena

The same light-scattering phenomena would occur if motion pictures were projected upon cotton sheeting, uncoated white canvas, etc. Not only is light lost by passing through the interstices of a loosely woven material, but internal reflections produce a fog which reduces the resolving power of the projection lens. If several thickness of ordinary sheeting are used in an attempt to reduce the loss of light by transmission, the projected picture, although brighter, looks even more hazy.

Some scattering of light is always involved in the beaded type of specular screen; but since the magnitude of this effect remains the same on screens of all sizes (provided that the size of the beads is the same), no fogging is visible on theater-size beaded screens. But with the very smallest beaded screens intended for non-professional 16-mm projections, the loss of contrast values in fine detail is quite noticeable.

Matte Surface Screens

The standard matte screen, whether of the painted canvas or the plastic type, has good diffusibility and high reflectivity (about 80% for a solid and 72% for a perforated screen). The reflected light is accordingly practically uniform at all angles from the normal to 70 degrees. A slight fade-off beyond 70 degrees is quite unimportant, since no projected picture can be seen in proper perspective from viewing angles greater than 45 degrees.

Much has been written on the deterioration of the reflective power of screen surfaces with age. The factors involved are so variable and uncertain when we stop to consider how many different types of screens there are and how many different local conditions exist, that it is impossible to give definite figures on reflection losses due to aging. Some loss is undoubtedly occasioned by dust and dirt which settles on the screen and becomes imbedded in the surface. Some is also due to darkening and yellowing of the glues, resins, and other substances which serve to bind the coating and prevent it from flaking off. Many plastics discolor with age; but it is believed that the newer plastic screens are comparatively free from this drawback. All screens darken rapidly in theaters where smoking is permitted, for the tars present in tobacco smoke condense on the screen to form a yellow-brown film which adheres like varnish.

Most of the screen pigments used at

the present time are chemically stable, and therefore not liable to discolor or darken because of oxidation or reaction with coal gas and other sulfurous fumes. Magnesium carbonate is the whitest of all pigments, but it has rather poor covering power, permitting some of the light to pass through it. Titanium dioxide and zinc oxide (zinc white) have better covering power, though lower reflectivity, especially of the violet and blue rays (which means that they are actually very faintly yellowish). White lead is inferior; and its use in screens is definitely contraindicated by the fact that it turns quickly and permanently brown upon exposure to coal gas.

Diffusing Surfaces

One of the very whitest and most permanent screen surfaces is obtained as follows: An undercoat of bright aluminum lacquer is first applied to sized canvas. Next, two coats of flat titanium and zinc white paint are applied. Finally, three or four coats of a non-gloss vinyl acetate lacquer containing magnesium carbonate are sprayed on. This screen may be washed with soapy water, when necessary, and restored to original brilliance by repainting with one coat of the magnesium carbonate lacquer.

In the days of silent pictures it was not unusual to find screens made of plasterboard in many of the smaller theaters. These were freshly kalsomined (reflectivity 65%) whenever sullied by wads of chewing gum, overripe fruit, and other missiles hurled at movie villains from the front rows. Although such screens served admirably in their day, it is obvious to everyone that their day is over. Kalsomine is no longer considered suitable for screen surfacing.

Can a modern perforated screen be restored by recoating? The older type of matte sound screen may be at least partially restored by spraying with special screen-surfacing preparations, but it is difficult to avoid plugging up the sound holes or reducing their size. In any event, painting screens is not properly a duty of projectionists. Screen resurfacing specialists should always be consulted whenever such work is contemplated.

Beaded Surfaces

Beaded screens cannot be resurfaced; and most modern plastic screens are not intended to be repainted in the theater. As a rule, such screens last for many years with judicious cleaning, but no screen can be considered absolutely permanent. These screens should be replaced with new ones when their condition falls below par.

In most theaters, however, it is the chief projectionist's duty to inspect the screen, have it cleaned whenever necessary, and to report evidences of damage to the management. In practically all theaters except those in very smoky cities, the high reflective power of a new plastic matte screen can be maintained for a very long time by proper screen care. A drop in reflective power from 72% to 68.4% within a year is not so alarming as it may seem. This decrease amounts to only 5%, a brightness difference which can just barely be discerned, and only by side-by-side comparison. And the chances are that brushing or cleaning the screen will restore at least 2% of the reflectivity, and that the percentage of loss per month or per year will not increase with the passage of time.

Incorrect cleaning of screens, however, can be ruinous. The dust which collects on the surface of the screen and accumulates around the edges of the sound holes often consists of hard, jagged particles. Vigorous rubbing of the screen with a cloth or stiff brush serves only to embed the dirt to such an extent that it can never be removed, thus lowering both reflective power and the original uniformity of the reflecting surface. An abused screen usually has a streaked appearance.

Cleaning the Screen

Before brushing the front of the screen, it is a good idea to go over the back with a vacuum cleaner if the speaker assemblies can be temporarily moved out of the way. Suction from the back will remove dirt from the perforations and prevent it from streaking the front.

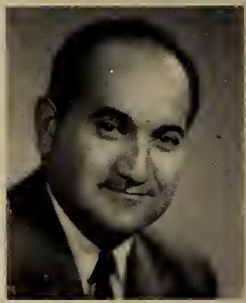
Then brush the entire surface of the front of the screen *gently* with a wide *soft-bristled* brush attached to a long handle. Brush the top half of the screen first, using a firm step-ladder for support. Brush with downward strokes only. Finally, brush the lower half of the screen with the same vertical strokes.

Always keep the screen brush dust-free at all times, and wrap it in a clean cloth when not in use.

It helps the screen in any theater to keep the stage curtains closed while janitors are cleaning the auditorium.

Strong Appoints Wiener

Hank Wiener has been named national representative in the engineering service



• Strong's Hank Wiener •

and sales department of Strong Electric Corporation, makers of arc lamps, reflectors, rectifiers, spotlights and slide projectors.

Wendt Joins AAAA

Wendt Advertising Agency of Toledo, Ohio, agent for many manufacturers of theatre and projection room equipment, has been elected to membership in the American Association of Advertising Agencies. Harold Wendt is president of the agency.

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With Which Is Combined Projection Engineering

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MONTHLY CHAT

ELSEWHERE in this issue is reported a summary of some figures published in the latest edition of *Film Daily Yearbook*, now off the press, whereby it appears that in the United States attendance and gross admissions were down in 1951 as compared with 1950.

And, on the same week these *Yearbook* figures appeared, *Variety* reported a trend toward drastic slashing of box office prices, down to the 25-35-cent level, in a strenuous effort to get the customers back.

Of course 300 people at 25 cents pay just as much as 100 at 75 cents (and buy more popcorn). The catch is, obviously, that cutting the admission from 75 to 25 cents may not bring in 300, but only 200—or 400. There is no way under the sun to find out except by trying it. If the trend that *Variety* thinks it detects really materializes, the experiment will be made. This industry can't afford just now to overlook any experiment that may possibly be helpful.

* * *

Those *Yearbook* figures, however, reveal another facet of the industry situation which is decidedly uncheerful. Do you remember back in '46, '47 or '48 recommending new lamps or a new screen or some such needful thing, and being told that business did not justify the expense? Well, the figures show that those were the years when theatre attendance was the highest in history, higher even than during World War II; and admission prices were the highest in history up to that time. Admission prices have gone up further since—more than 25 per cent further—but the number of tickets sold has dropped 33 per cent. All in all, those years 1946, 1947 and 1948 look in the restrospective statistics like the most prosperous this industry has ever had, but did theatre-owners talk like it then?

Today, when the 90,000,000 admissions per week have dropped off to 60,000,000, very possibly the owner cannot afford, out of current take, those new amplifiers that should have been bought five years ago—but why didn't he buy 'em then? Didn't matter then?—90 millions came rushing in every week anyhow? Yes, but now when those improvements are so desperately needed to keep 'em coming, the income is inadequate.

Can it be that one of the troubles of the industry lies in a deep-rooted practice of transferring too large a percentage of gross profits from the business to the private pocket of the owner, at the expense of the amortization account and depreciation account? Have some owners been like the peon in the song who didn't need to fix the roof while the sun shone and couldn't during the storm?

Here's Nationwide Patron Acceptance of RCA's New Synchro-Screen

ynchro-Screen is today's big story. It's big because patrons re telling it from coast to coast. Everywhere they've seen it, ιey like it—and they say so.

HERE'S WHY THEY'RE ENTHUSIASTIC

oday's average man considers himself a critic of "how" picιres are presented. He's a self-styled expert on "surround ghting." He knows about uniform screen brightness. And he's ιterested in seeing what you've done along these lines.

HERE'S WHY YOU'LL BE ENTHUSIASTIC

ynchro-Screen gives you a brand-new story to tell—about omething your patrons can actually see. It's not an investment ιat you locate in the projection booth or behind the walls—it's ght up front telling every individual in your audience that ou're up-to-the-minute in your methods.

You'll get a personal thrill, too, out of seeing your pictures on Synchro-Screen. You can't imagine what a difference this one piece of equipment makes until you've actually seen it—until you've compared it with the results you are getting with your present black-mask screen.

CALL YOUR RCA DEALER NOW

It will pay you to be first in your community to offer this new method of presentation. Call your RCA Theater Supply Dealer now, and ask him about Synchro-Screen for your theater.

HERE'S HOW SYNCHRO-SCREEN WORKS

Scientifically designed wings surround screen with reflected light—eliminate the harsh contrast af black mask. Synchro-Screen makes picture seem larger—makes it appear to flaw aff edges af screen onto wings.

Main portion of screen employs new RCA Even-Lite principle.

Synchra-Screen is pre-fabricated and packaged for easy assembly ... available for picture widths of any size.

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RADIO CORPORATION of AMERICA
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INTERNATIONAL PROJECTIONIST

VOLUME XXVII JULY 1952 NUMBER 7

Heart of the Projector Mechanism

By ROBERT A. MITCHELL

THE INTERMITTENT MOVEMENT is the basic unit of the motion-picture projector—the one that translates the series of still photographs into a moving picture. Unless it functions smoothly and accurately, the projected moving picture will be unsteady, jumping, weaving, or trembling on the screen.

To attain the necessary accuracy in the registration of the successive film-photographs, all American projector manufacturers construct the component parts of their intermittent movements with a tolerance of less than 1/10,000 of an inch. The projectionist follows up the careful work of the manufacturer by maintaining the intermittents in good condition, keeping them properly lubricated and adjusted at all times, and replacing sprockets, star-wheels, and other parts whenever signs of wear become apparent.

To get a firm grasp of the theory of a motion-picture projector, it is necessary to consider *both* the intermittent *and* the rotating occulting shutter as an integrated system. Otherwise one might easily ignore the fact that the shutter must be "in time" with the intermittent no matter how the picture is framed. Many of the early builders of motion-picture machines did ignore this fact with the result that "travel-ghost" flared on the screen whenever the picture was framed up or down.

Travel Ghost

If the shutter be removed from a projector, bright travel-ghost streaks will extend vertically all the way from top to bottom of the screen. Moreover, these ghostly streaks will haunt all bright objects in the picture, following them around wherever they happen to go. Believe it or not, a "projectionist" once removed the shutters from both of his machines, and was very much pleased that the picture was brighter. Either he believed that "there ain't no sech thing as ghosts"! or the glass in his observation ports needed cleaning!

If the shutter gets out of time by even the tiniest amount, thereby cutting off the light a little too early or too late relative to the pulldown action of the intermittent sprocket, shorter ghosts will be seen as a flickering haze on either the top or bottom edges of all bright areas in the picture. The old saw anent travel-ghost bears repeating:

Ghost DOWNWARD, shutter EARLY;
Ghost UPWARD, shutter LATE.

Or, as a parallel to the hard life of the average projectionist: "Down early, up late."

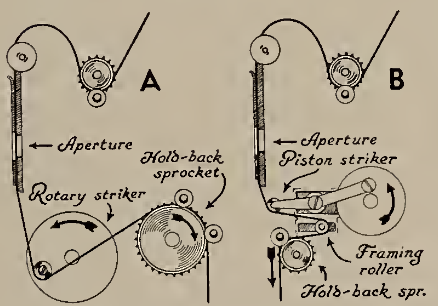


FIG. 1. The striker movement—it struck many a nickel into the coffers of the old-time nickelodeon. Rough on film and on the eyes of the audience, both the "dog" striker in *A* and the "piston" beater in *B* jiggled many a celluloid romance to its happy conclusion. The pulldown sprockets revolved at constant speed.

Plain titles having white lettering on a black background reveal travel-ghost, if it exists at all, very prominently.

But it is not in the least necessary to wait for travel-ghost to make its appearance on the screen in order to deal with it. This defect can be prevented by setting the shutters before operating the projectors.*

If it happens that travel-ghosts appear on both the tops and bottoms of bright objects, the trouble is obviously much more serious than a merely mistimed shutter. If this double ghost makes its appearance only intermittently probably either the shutter itself or one of its driving gears has worked loose. A screwdriver will correct the trouble in a jiffy. On the other hand, if the double ghost is a continuous apparition, the shutter blades are too narrow. If the old shutter is non-adjustable, a new shutter with wider blades is required.

The Shutter

When conventional 3-to-1 intermittent movements are used, the blades of fan-type or conical ("dished") shutters should never under any circumstances be narrower than 90 degrees in angular width. (Protractors suitable for the angular measurement may be obtained cheaply at stationery and variety stores.) The 90° width happens to be the theoretical minimum for all 3:1 intermittents. It can be used where sufficient screen illumination poses a serious problem, as in large drive-ins. Wider shutter blades (from 95° to 105°) are required in theatres

* Place a fixed reference marker over any tooth of the intermittent sprocket when at rest. Then slowly turn the projector by the hand-wheel until the second sprocket-tooth from the first (tooth no. 3 when the first tooth is counted as tooth no. 1) comes under the marker. At this point adjust the shutter until one of the blades is in "mid-occultation" position.

where high screen light-levels prevail in order to avoid traces of flickering travel-ghost and a trembling appearance of bright objects in the picture.

The exact blade-width needed in any special case depends not only on the rapidity of the intermittent pulldown of the film, but also on such factors as the rapidity with which the shutter blades move through the light, the width of the light-beam, and the amount of backlash in the gear-train between the intermittent movement and the shutter shaft.

Perfect projection, projection free from the 24-cycles-per-second trembling of the image when the shutter blades are just a trifle too narrow (you'll have to sit down front to see it), demands shutter blades slightly wider than theory calls for. It is always better to have the blades too wide than too narrow; and it is comforting to realize that the slight loss of light occasioned by blades slightly too wide is far too small to be perceptible even to trained observers.

The balancing or "cutoff" blade must be *exactly* the same width as the "master" blade—the one that occults (hides) the film from the projection lens and the screen during the pulldowns. If the cutoff blade were either narrower or wider than the master blade, a terrific 24-cycle flicker would be introduced.

The normal 48-cycle flicker is nearly always perceptible until our eyes get accustomed to it, but it is not definitely troublesome except when picture illumination is excessive.

The fact that the shutter acts with a frequency twice that of the intermittent explains why travel-ghost flickers much worse than the normal picture image. Since the film is pulled down intermittently at the rate of 24 frames per second, the frequency of travel-ghost must likewise be 24 cycles per second—a periodicity too low, especially when illumination levels are high, to avoid the effect of violent flicker.

Framing

The necessity for some means of framing the picture complicates the design of the intermittent-shutter system. The gears driving the intermittent cannot merely be rotated relatively to the shutter driving gear during the frame-shifting or "racking" process without getting the shutter out of time and thus introducing travel-ghost. Every projector mechanism worthy of the name has incorporated, therefore, some means of automatically compensating the shutter rotation whenever the picture is shifted up or down.

Very few projectors, none commonly used in the U.S.A.. are so constructed that framing position does not affect the rotational position of the shutter without a compensating device. (One such projector was the Power's. Only a few of these mechanisms can be found in theatres today.)

In one of the most popular types of American projector the picture is framed by rotating the entire geneva intermittent movement around the axis of the sprocket and star-wheel shaft. This causes the entering of the cam-pin into a star-wheel slot to be advanced or retarded. In effect, the intermittent is accelerated or decelerated when framing, even though the actual framing is accomplished by revolving the intermittent sprocket. This arrangement, however, would neither advance nor retard the shutter and its driving gears in their rotation if no compensating rigging were present. The shutter would accordingly creep out of time with the intermittent during framing.

It is to the old Simplex Regular that we owe one of the most compact and serviceable shutter-compensating arrangements ever devised. The intermittent unit is placed in a large cam-ring which turns through the same angular distance as the intermittent sprocket does when the framing knob or lever is manipulated.

The cam-ring works a slide arrangement whereby a *spiral* shutter-drive gear is thrust forward or pulled back on the flat-faced shaft which drives it. Because the shutter-drive gear has spiral teeth, as does the mating gear on the shutter shaft, the sliding movement of the spiral driving gear advances or retards the rotating shutter by the required amount during framing. The pitch of the cam of the cam-ring in which the intermittent movement is held determines the amount of shutter compensation.

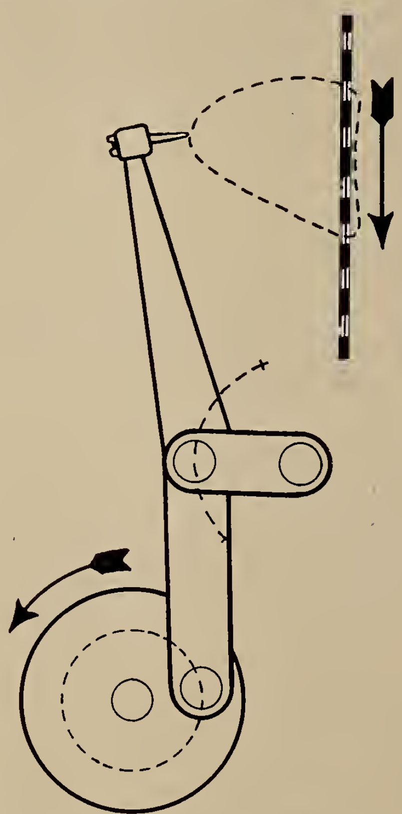


FIG. 2. A 1-to-1 ratio claw movement of Askania make. The hinged lever modifies the action of the revolving cam to impart to the pulldown tooth the characteristic movement indicated by the dotted line. Precise in action, but rough on the sprocket holes, the claw has been relegated to the realm of cameras and 8-mm and 16-mm projectors.

The little shutter-drive spiral gear is mounted in a small box or bracket which is grasped by an arm, or lever, moved by a rod connecting it with the cam-ring. This arm works against a powerful spring. It is this spring that holds the pivoted arm against the connecting rod, and the connecting rod against the cam-ring.

In addition, the pivoted arm which moves the spiral shutter-drive gear in its little box is pivoted on a special *sliding* bracket. This bracket moves only when the shutter timing-knob is turned.

The entire arrangement, which seems complicated when described, is in reality marvelously simple, and serves the dual function of compensating the shutter during framing and permitting the projectionist to time the shutter even while a picture is being projected.

The Simplex Regular was first with this arrangement; and no complaint has ever come to the writer that it has even once failed to work properly. The Super Simplex retained it in original form.

Continuous Projectors

Even though the intermittent-shutter system is the heart and soul of the conventional projector, several attempts have been made to discard this "indispensable" system altogether, delegating its functions to optical compensators. Some of these attempts have actually met with commercial success, although this success was nipped in the bud by certain drawbacks.

Just imagine a workable projector having neither intermittent nor shutter! We can have such a projector provided we are willing to be driven nearly crazy by a complicated system of rotating, revolving, tilting, and vibrating lenses and mirrors which easily gets out of order and cannot be repaired except by highly trained experts at a highly elevated price.

There is no need to go into details here concerning the Mechau, Vig, Holman, and other "continuous" mechanisms. The opinion that the intermittent type of projector is definitely superior in performance to any continuous projector yet devised is practically unanimous.

Types of Intermittents

So many different types of intermittent movements were devised in the later days

(*Continued on page* 33)

Continuous Arc Projector Light Meter‡

By HARRY P. BRUEGGEMANN

This is a system for monitoring the light output of an arc projector during projection. It comprises a piece of optically flat glass, not silvered, placed in the projector light path, at an angle of 45°, and ahead of the film gate. The light thus thrown off to the side is measured by a photovoltaic light meter.

ARC PROJECTORS are normally built for theater projection, and they are designed to give a picture of pleasing quality. However, when arc projectors are used as laboratory production equipment for timing prints or for side-by-side comparison of prints, they must meet certain rigid specifications. One of these is the maintenance of an absolutely steady light output.

Experience at Cinecolor has been that arc projectors vary in their light output by as much as 20% during a 10-min projection, in spite of good operational practices and frequent equipment maintenance.

This variation, of which the projectionist has no indication, seems to be due to the carbon feed, slight imperfections in the carbons themselves, voltage fluctuations and mechanical variables. A 20% change in light output would probably never be noticed in a theater, provided it is gradual enough. To a timer though, who is attempting to adjust scene densities to within one-half of a printer point of what the producer wants, a change of this magnitude is too great.

Manual Control Feasible

A number of systems for controlling the arcs were investigated. One such system consisted of a photoelectric cell, the output of which would control a thyratron, which in turn would control the carbon-feed motor in such manner as to maintain a constant luminosity. This has the advantage of being automatic, the control being maintained without requiring adjustment by the projectionist. As far as could be determined, there was no such thyratron arc controller on the market, hence it would have to be designed. It was realized that this undertaking would be very expensive. All types of photoelectric light meters were eliminated, also, because of design expense.

The only system which seemed feasible would make use of a photovoltaic cell type of meter so arranged as to keep the projectionist continually informed as to the light output of the projectors. With this guide, he could maintain the light at the standard value by trimming the arc.

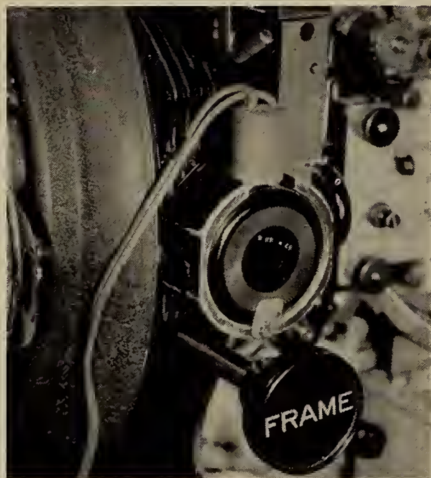


FIG. 1. View of the first Cinecolor model mounted in a Simplex projector.

A photovoltaic cell is practical because it maintains its calibration quite well if protected from heat, moisture and intense light. Since a great deal is known about the use of photovoltaic cells as light meters, design of such a system should be relatively simple.

Accordingly, a projector light meter was built around a photovoltaic cell. In order to monitor the light actually reaching the screen, a piece of unsilvered, optically flat glass was placed in the light path at an angle of 45°. This threw a beam of light off to the side of the projector, amounting to approximately 10% of the total output. This was more than enough for any photovoltaic cell, and at the same time caused a loss of only 10% in the screen brightness. This could be compensated for by trimming the arc. Obviously, the glass had to be positioned between the arc and the film gate.

Photocell and Meter

The photocell was a Weston Photronic cell type RR, and the associated ammeter was a 0 to 20 μ-a, 2500-ohm Weston meter. Since the light from the optical flat was far too much for the cell, a means of attenuating this light was necessary.

A dense green glass was placed ahead of the cell in the first model. This cut down the light to a workable level, but permitted a great deal of infrared radiation to be transmitted. This infrared energy raised the temperature of the cell too high for stability, so an Aklo heat glass was added. This promptly cracked. Thus it was evident that another means of reducing the heat was necessary. Ventilation slots were cut into the casting holding the cell, and this helped some. but the Aklo glass still would not stand up.

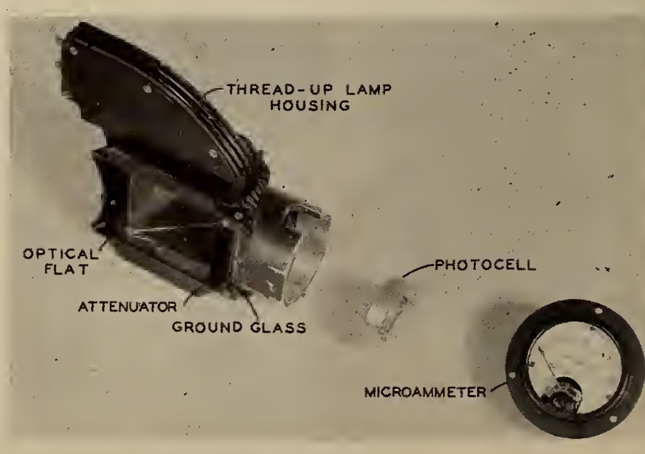
At this point the projectionists at the MGM laboratory, who had been informed of our project and had built a model of their own, thought of replacing the dense glass filter by a sheet of brass shim stock with pinholes. This solved the excess heat problem, since the infrared radiation was reduced as much as the light. The first Cinecolor model used a bakelite mounted photocell, but MGM used a metal encased cell for conduction cooling. The MGM modifications resulted in a cell mounting which was only slightly warm to the touch, even after many hours of continuous operation.

The Weston microammeter, with its 2500-ohm resistance, gave a fairly linear response when coupled to the type RR Photronic cell. Various devices were considered for improving the linearity, including shunt resistances, lower resistance ammeters, and other types of photo-

(*Continued on page* 10)

FIGURE 2.

The three basic units of the second Cinecolor model.



‡ Journal, SMPTE, July, 1952.


AS HISTORY UNROLLS
1922
Russian Republics Form Union
Strong designs the first automatic arc control
1925
Wm. Jennings Bryan and Clarence Darrow Tangle in Scope's Evolution Trial in Tennessee
The first Strong projection arc lamp produced
1928
First All-Talking Picture "Lights of N.Y." Presented July 6, at Strand Theatre, N.Y.
STRAND
ALL-TALKING HIT
LIGHTS OF N.Y.
ALL-TALKING
Strong develops the HY-LO projection lamp
1930
Babe Ruth Signs the Biggest Contract in Baseball History, $160,000 for 2 Years
Strong develops the Portable Low Intensity arc lamp
1932
Lindbergh Baby Kidnapped
WANTED
INFORMATION AS TO THE WHEREABOUTS OF
CHAS. A. LINDBERGH, Jr.
Strong brings out the A.C. arc lamp
1933
Prohibition Ends in U.S.
Strong develops the Suprex lamp
1935
Hauptmann Found Guilty
&
Social Security Bill Signed
Strong starts production of reflectors
1936
Edward VIII Abdicates
Strong develops Junior Hi 16mm projection lamp
1938
Howard Hughes Flies Around World in 3 days, 19 hours, 14 mins. Record
Strong develops the One-Kilowatt arc
1948
Gandhi Assassinated
Strong develops the Trouper arc spotlight
1949
Chiang Kai-shek Retires
Strong develops the Mighty "90" projection lamp
1950
Korean Hostilities Begin
Strong develops the Trouperette spotlight
THE Strong ELECTRIC CORPORATION
31 CITY PARK AVENUE TOLEDO 2, OHIO

Big Future Seen for Theatre Tv

THEATRE Tv has a tremendous future—it "*can and will produce big profits*" and moreover "will become an established part of our way of life," Fred C. Matthews, president of Motiograph, told the Kentucky Association of Theatre Owners at a meeting last month in Louisville. However, Matthews stressed, theatre owners must buy and install the video equipment first — before there are enough programs for it and before the transmission facilities are fully adequate. Once theatres are equipped to show Tv suitable and exclusive program material will appear and transmission facilities for bringing it into the theatre will develop. That is the way home Tv grew, Mathews noted; first, people bought receivers, then programs improved and coaxial networks spread.

Matthews' company, Motiograph, is associated with Trad Television Corporation in the production and sale of large-screen (up to 24 feet) theatre video apparatus.

"The installation of theatre Tv," Matthews told his audience, "will not immediately bring old and new patrons to your theatre, nor can you expect immediate profit by such an installation. That's because of the lack of a large number of programs for theatre Tv and the shortage of telephone facilities to bring the programs to you."

Theatre Tv is in the same position that home Tv was, not many years back, Matthews explained; there were few home television sets in the beginning and there were not very many programs. Today home sets number over five million and there are programs in quantity. Some are good, and they will grow better.

As more theatre Tv sets are installed there will be more and better Tv programs exclusively available to them. Good prize fights and important football and basketball games will be available in quantity and Broadway stage shows, opera and ballet will be among the many programs available on an exclusive basis to theatres.

The speaker reminded his audience that programs already have played to large audiences and demonstrated the pulling power of video in the theatre. Walter Reade's St. James Theatre in Asbury Park, N. J., "which has the honor of having the first installation of Trad television equipment," sold out its 1558 seats by 6:00 o'clock on the evening of the Robinson-Turpin fight, Matthews recalled, while a crowd of 2,000 more gathered outside, convincing the management that the house could have been sold out twice over.

Matthews did not deny that prize fights may attract a type of patron who will not come back later to see moving pictures. But, he pointed out, the type of patron that would be attracted to the theatre by a televised showing of "South Pacific" or of any of the great Broadway musicals, comedies or dramas, is the type that would become a permanent customer, for picture shows in addition to Tv shows.

Theatre television, the owners were reminded, must have programs sufficiently varied to attract all classes of persons. The sports audience is too limited in size.

(*Continued on page* 33)

CONTINUOUS ARC METER

(*Continued from page* 8)

cells; but they all required more light, and consequently would have placed more heat at the photocell. Since heat dissipation was the biggest problem of the project, it was decided to accept the slight non-linearity.

The only advantage to improving the linearity would be to eliminate the scale compression in the operating range and thus increase the sensitivity. With the present model of the meter, however, luminosity fluctuations can be kept within about 3% and this is considered good. Most of this fluctuation is due to the coarseness of the trim, not the accuracy of the meter.

Constructional Details

The location of the unit in the projector is shown in Fig. 1. This view shows the first Cinecolor model mounted in a Simplex projector, just above the framing knob. The rear end of the photocell, showing the bakelite casing, is seen together with the two wires leading to the microammeter. The ammeter is mounted on the wall of the projection booth just below the viewing port, so that the projectionist can see the screen and also watch the meter both at the same time.

Figure 2 shows the three basic units of the second model—the optical flat and brass attenuator mounting, the metal encased photocell, and the microammeter. The optical flat occupies the space normally used by the thread-up lamp when it is lowered for threading up. The lamp was repositioned so that it missed the optical flat when lowered. The perforated brass attenuator slides into a slot cut just ahead of the photocell housing. The edge of this attenuator is visible in the figure. There is a ground glass immediately behind the attenuator to break up the light through the pin holes, and thereby avoid any local "hot spots" on the surface of the photocell. Figure 3 is a schematic drawing of an arc projector with the unit installed.

In operation, the system requires only a 5-minute warm-up period in the morning, after which it will remain constant all day. The warm-up is necessary because the photocell has greater sensitivity when cold, and temperature equilibrium must be reached before the system stabilizes.

During projection, the projectionist need only keep the needle at a constant standard value by appropriately trimming the arc. The use of this system has resulted in a great improvement in projection quality, both at Cinecolor and MGM.

Thanks are expressed by the author to James Phillips, chief projectionist at Cinecolor, for initiating and doing most of the original work in this project; and to MGM's Merle Chamberlain, chief projectionist, and Clayton C. Troxel, Jr., projection engineer, for their modification which contributed to the success of the final model.

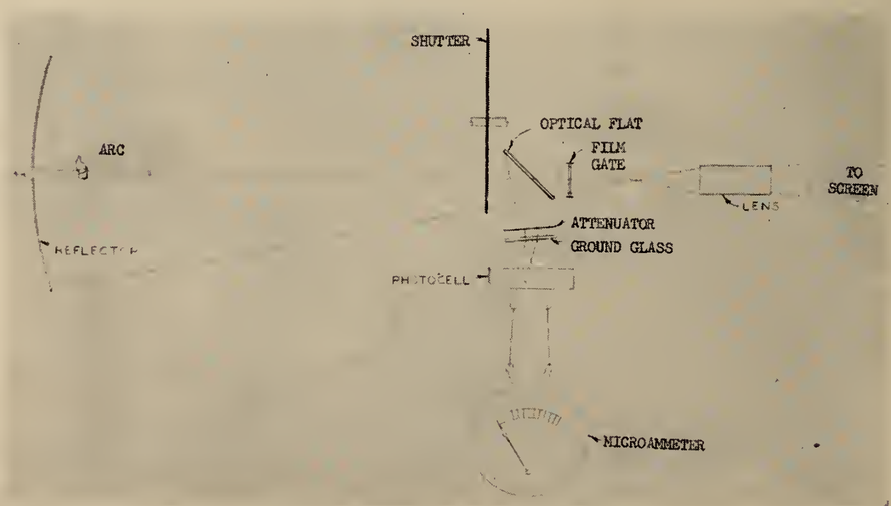


FIG. 3. Schematic of system—top view.

OUR MARINES' LIFELINE to the sea was in danger. A Communist force of 4,000 men had seized the key hill overlooking Hagaru-ri in the desperate Chosin Reservoir fighting. The hill had to be taken. But there were no combat forces available to make the fight.

Lieutenant Colonel Myers, then a major, rallied together clerks, cooks, and other service personnel, and led a makeshift unit of 250 men in an assault up the snow-covered 600-foot hill. Lacking combat officers and non-coms, Colonel Myers ranged the entire attacking front, leading his outnumbered forces upward in the face of murderous fire concentrated on him. After 14 hours of bitter struggle, the enemy was routed, the hill captured, and the route to the sea secured. Colonel Myers says:

"When a handful of men can help turn the tide of history, just think of the invincible strength of 150 million people working toward a common goal—a secure America! That's what you, and millions of people like you, are accomplishing with your successful 50-billion-dollar investment in United States Defense Bonds.

"Peace doesn't just happen—it requires work. Our troops in Korea are doing their part of the job. You're doing yours when you buy United States Defense Bonds. Together, we can hammer out the peace we're all working for."

★ ★ ★

Now E Bonds earn more! 1) All Series E Bonds bought after May 1, 1952 average 3% interest, compounded semiannually! Interest now starts after 6 months and is higher in the early years. 2) *All maturing E Bonds* automatically go on earning *after maturity*—and at the new higher interest! Today, start investing in better-paying Series E Bonds through the Payroll Savings Plan where you work or the Bond-A-Month Plan where you bank!

Lt. Colonel Reginald R. Myers, USMC Medal of Honor

Peace is for the strong! For peace and prosperity save with U.S. Defense Bonds!

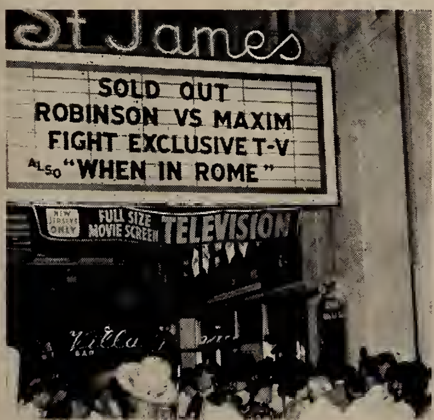
Projecting Television to a Paying Audience

Leo Kane (left) and Paul Mitchell, members of Local 243, operating the Trad-Motiograph Tv controls that put the Robinson-Maxim bout before 1,700 shrieking enthusiasts at the Walter Reade St. James Theatre, Asbury Park, N. J.

"EASY TO OPERATE," is the comment of IA members Leo Kane and Paul Mitchell anent this Trad-Motiograph Tv equipment in their projection room in Asbury Park, New Jersey. They are veterans in its operation, for theirs is the first T-M theatre installation. They were at these same controls nearly a year ago, when their theatre showed the Robinson-Turpin bout to an audience even more turbulent than this year's.

The equipment pictured in the photograph on this page is all there is to the projection room part of the installation. It consists of a monitor unit (which is also the receiver), here shown operated by Mitchell, and a control unit under Kane's fingers. The complete system includes a third element, the Tv projector proper, located in the auditorium and remotely controlled in every detail from this small, six-knob control panel.

In actual operation, the projectionists see and hear the image either on the monitor panel here pictured, or through their regular viewing ports and regular projection room speaker. The monitor panel, which includes the Tv receiver, is tuned in much the same way as any Tv receiver. The control unit includes a changeover provision: the projector proper is of dual-channel construction and in event of mechanical or electrical or optical trouble can be switched over instantly to emergency channel—an operation Leo Kane performed deftly during the Robinson-Maxim showing this June.



Thousands of would-be patrons, anxious to pay $2.40 to $3.60 each, had to be turned away.

"Midway through the fight," a Walter Reade circuit executive tells IP, "the picture flickered a bit and we immediately switched over to the other projection channel. I doubt if the audience realized a change had been made."

This executive adds:

"Projection and reception were completely adequate in all respects, and the boys in the projection room reported no trouble or incidents. Performance was excellent throughout."

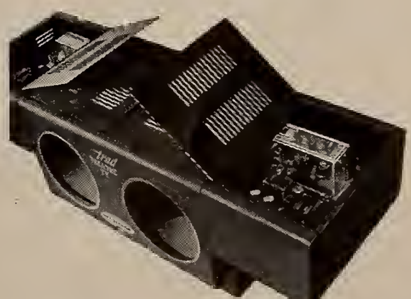
Asbury Park is roughly 50 miles (beeline) from New York City, a resort on the Atlantic Coast. Because of the curvature of the coast straightline transportation except by air does not exist, and the distance is too short for flight. Roads and railroads must curve inward with the coastline. Therefore the trip between Asbury Park and New York takes roughly two hours by railroad and longer than that by either bus or private car. The St. James Theatre there was the closest theatre to Yankee Stadium permitted to show the bout on television.

Transmission was by micro-wave link to Homedel, N. J., a relay point on the Bell Telephone micro-wave trunk; and thence by equalized telephone line to the theatre. Reception was unmarred by "line troubles."

The St. James has 1,558 chairs, roughly 300 in the loges and 1,500 others. Loge seats sold for the bout at $3.60 each; others at $2.40 each, and standees also paid $2.40 each. Owing to fire regulation, only 150 standees were admitted, though thousands applied.

Patrons were predominantly a fight crowd rather than a motion picture audience. Youth and middle age predominated, and not more than one in four was a woman. They reacted like a fight crowd, leaping to their feet, shouting and screaming. Otherwise, however, they were well-behaved, and exhibited none of the disorder encountered during the Robinson-Turpin fight of the previous September, when would-be patrons paid no attention to the fact that the house was sold out but tried to force their way in regardless. On the present occasion the overflow accepted refusal more philosophically. They waited (some thousands of them, it was estimated) outside the theatre, until their

(*Continued on page* 31)



Third and only other unit of the Trad-Motiograph Theatre television system, the dual channel projector, was mounted on the face of the St. James balcony and operated via the control panel in the projection room

Fox Unveils Eidophor, Arc-Lit Color Tv

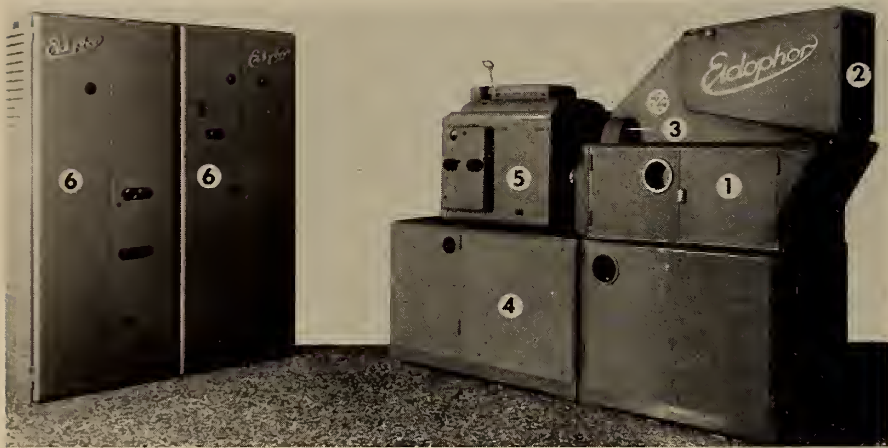


FIG. 1. Item 1 is the projector, containing curved mirror, Eidophor liquid and schlieren optics; Item 2, light beam hood; color wheel is inside Item 3; refrigerator and pump in Item 4; Item 5 is the Ventarc; Item 6 cabinets contain the Tv receiving and power circuits.

ARC-LAMP screen brightness and full color feature the Eidophor system of television. This system, demonstrated by Twentieth Century-Fox in New York at the end of June, uses an arc lamp instead of a cathode ray tube to form the image. The particular lamp used in the New York demonstrations was the Ventarc H. I. Carbon "Blown" Arc described in IP for July, 1950 (Page 13). Like the Eidophor itself, the Ventarc is of foreign invention. At the New York showings it was operated at 125 amperes to illuminate a 15-foot screen.

Color is added to Eidopohor television by the Columbia Broadcasting System's "field sequential" color-wheel system.

Figure 1 shows a complete Eidopohor system (single projector). The system consists of two units—the cabinets at the left of Figure 1 and the projector assembly at the right. The cabinets contain the regular television receiving and power circuits, which are essentially conventional. The projector set-up includes the Ventarc, the projector proper in front the Ventarc, and the two cabinets on which the lamp and the projector rest, which contain needed auxiliary apparatus.

Principle of Operation

To understand the general principle of operation of the Eidophor theatre Tv consider Figures 2 and 3. In Figure 2, assume that a source of light is located at the left of the figure, and that beams of light enter the figure through the "schlieren" slits between bars *a*, *b*, *c*, *etc.* The light is intercepted by the lens and focussed upon the right-hand bars *a'*, *b'*, *etc.* The arrangement is such that no light emerges at the right-hand side of Figure 2, since the image of each slit on the left (through which light enters) is focussed by the lens upon a bar at the right.

A similar arrangement exists in Figure 3 but a small prism has been added at *N*. Light passing through *N* is deflected from its original direction and therefore it does emerge at the right, where it traverses a second lens and is focussed upon a screen.

If a television signal could be used to create and obliterate prisms such as *N*, the arrangement of Figure 3, if placed in the path of an arc light, could reproduce television images. This is the way the image is formed in the Eidophor system.

Figure 4 is a schematic of the Eidophor optics. At left, Item No. 1 is the Ventarc. The light beam passes through the rectangular aperture, Item No. 2, which gives the proper 3-to-4 rectangular shape. Thence the beam traverses the color wheel, and a lens, Item No. 4. The schlieren bar-and-slit assembly is Item No. 5 and is one of the improvements in the present Eidophor over the larger and cruder model, now abandoned, which was based on Figures 2 and 3. In each of those figures (which are presented here only to illustrate a principle) there are two sets of bars and slits—one at left and one at right. But in Figure 4, Item No. 5 is made to fulfill the function of both sets. This is accomplished by putting mirror surfaces on the left side of the bars. The optical action in Figure 4 is as follows:

Optics of the System

Light emerging from Item No. 4 touches upon the bar and slit assembly. Half passes through the slits and is lost. (This loss corresponds to the shutter light-loss of a conventional projector.) The other half strikes the mirror surfaces of the bars and is reflected downward to the spherical mirror, Item No. 7. In a condition corresponding to that of Figure 2 this light is thrown back by the spherical mirror to the mirror bars, and by them back to the arc.

But in a condition corresponding to that of Figure 3 a portion of the light, on being reflected upward by the spherical mirror, is so deflected that it passes between the bars and thus to Item No. 10. Item No. 10 is a projection lens, Item No. 11 a mirror and Item No. 12 the theatre screen. Thus the theatre screen

(Continued on page 17)

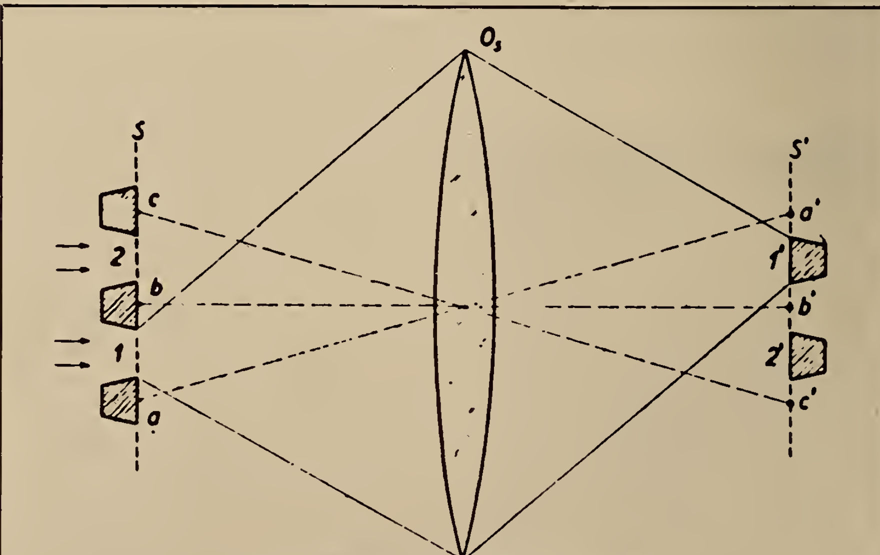


FIG. 2. Principle of a schlieren optical system

Inside New York—50 years ago . . .

Re-creating a corner of old New York for the theater is a stage designer's problem.

But re-creating it so that the color camera will see it and the sound camera hear it as the eye saw it and the ear heard it 50 years ago is quite another story.

It is in reducing problems of this character that the Eastman Technical Service is of great service. Their representatives collaborate with studio technicians; they scrutinize the scenery, establish light and color balances; they help select type of film, color or black-and-white, best to use. Special laboratory procedures, too, may be worked out to ensure precise processing—all to make sure that every foot of film produces best results.

To maintain this service, the Eastman Kodak Company has branches at strategic centers . . . invites inquiry on all phases of film use from all members of the industry. Address:

Motion Picture Film Department

EASTMAN KODAK COMPANY

Rochester 4, N. Y.

East Coast Division
342 Madison Avenue, New York 17, N. Y.

Midwest Division
137 North Wabash Avenue, Chicago 2, Illinois

West Coast Division
6706 Santa Monica Blvd., Hollywood 38, California

FOX UNVEILS EIDOPHOR, ARC-LIT COLOR TV

(*Continued from page 14*)

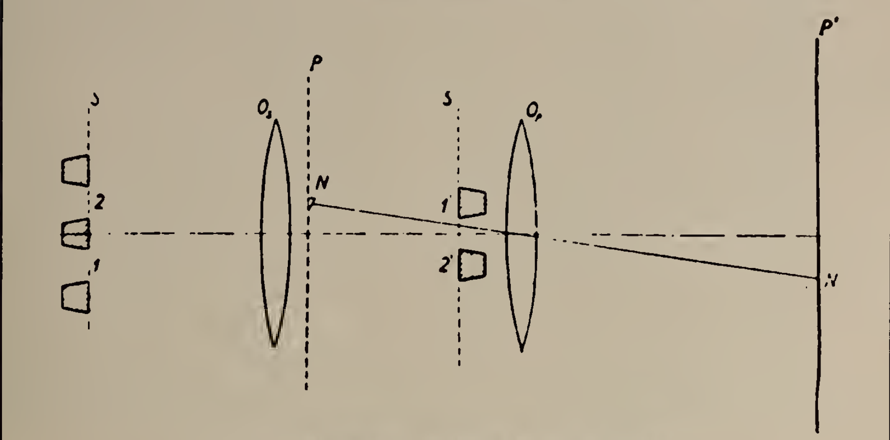


FIG. 3. Development of schlieren optical system

is illuminated whenever an equivalent of the prism, *N*, of Figure 3, is interposed in the light path of Figure 4. Such equivalent prisms must be created by a television signal if the theatre screen is to display a television image.

"Prisms" In Oil

Item No. 6 of Figure 4 is an electron gun, entirely similar in general principle to the electron gun inside any Tv picture tube. A beam of electrons is created, focussed and deflected in the normal way, and modulated by a Tv signal. This beam scans the area, Item No. 8, of Figure 4. This is, of course, the illuminated area, the bright rectangle of light corresponding in shape to the aperture, Item No. 2.

Now here is the heart and secret of the Eidophor system:

The surface of Item No. 7, the sperical mirror, is coated with a thin layer of oily liquid. It is this liquid surface that is bombarded by the electron beam; it wrinkles up into a wavy surface when bombarded and in proportion to the bombardment. Where the image is dark there is no bombardment; the surface of the oil remains smooth; the light is reflected to the mirror surfaces of the schlieren bars and returned by them to the lamp; the theatre screen remains dark. But where there is light in the Tv image the oil surface is temporarily covered with wavelets that correspond optically to Prism N in Figure 3; light from these wave-surfaces is reflected to the spaces *between* the mirror bars and this light does reach the theatre screen. The intensity of each light-dot on the screen depends on the height of the wavelet, which in turn depends on the intensity of the electron bombardment —which in turn is controlled by the strength of the Tv signal at that instant.

Other details of this method of modulating the light of an arc lamp to produce a Tv image are discussed below; at this point it might be well to complete the formation of the screen image by tracing the addition color to it.

The image structure is conventional, 525 lines, interlaced. It is formed in the conventional way; the electron beam traces lines 1, 3, 5, etc., and then goes back to interlace between them lines 2, 4, 6 and so on. One frame is complete when the interlacing is completed; half a frame (consisting only of the odd-numbered lines, or only of the even-numbered lines) is called a field.

Color Mechanism

Each field, by reason of the synchronized color wheels on the Tv camera and Tv projector, is seen by the camera and shown by the projector in one color only. The sequence of fields in the three primary colors is merged by the eye into a full-color picture. This "field sequential" system of providing Tv color is of course not "compatible" with the "line sequential" or "dot sequential" methods; and is also not "compatible" with conventional black and white Tv.

Equipment Details

To return to the details of the projector. Three important details remain to be examined.

First: it will be remembered that the oily liquid on the surface of the spherical mirror bunches itself up into wavelets (or more accurately, "pimples") under electron bombardment. But each wavelet or pimple must subside again into a flat surface before the electron beam passes that way on its next scan of the surface. The time of subsidence depends on the viscosity of the liquid, which is very carefully compounded to possess exactly the desired degree of viscosity. But viscosity changes with temperature; and this liquid is being bombarded not only by an electron beam but also by the light and heat of the Ventarc. Hence refrigeration is necessary. The temperature requirements are not too critical, but they exist and must be met. A refrigerator unit is installed in the cabinet under the arc lamp.

The liquid not only accumulates heat, which must be neutralized by refrigeration; it also accumulates electrical charges as a result of the cathode ray bombardment. To enable these charges to leak off the liquid is made electrically conductive by addition to the oil of unspecified substances. The electrical conductivity thus imparted to the liquid, however, is not very great; the charges do not leak off completely in the time necessary; therefore the spherical mirror is made to revolve as the arrowhead in Figure 4 shows. As the mirror revolves, the liquid passes under a knife-edge, Item No. 9, which smooths out the last remaining traces of wrinkling and provides the desired level surface.

(*Continued on page* 30)

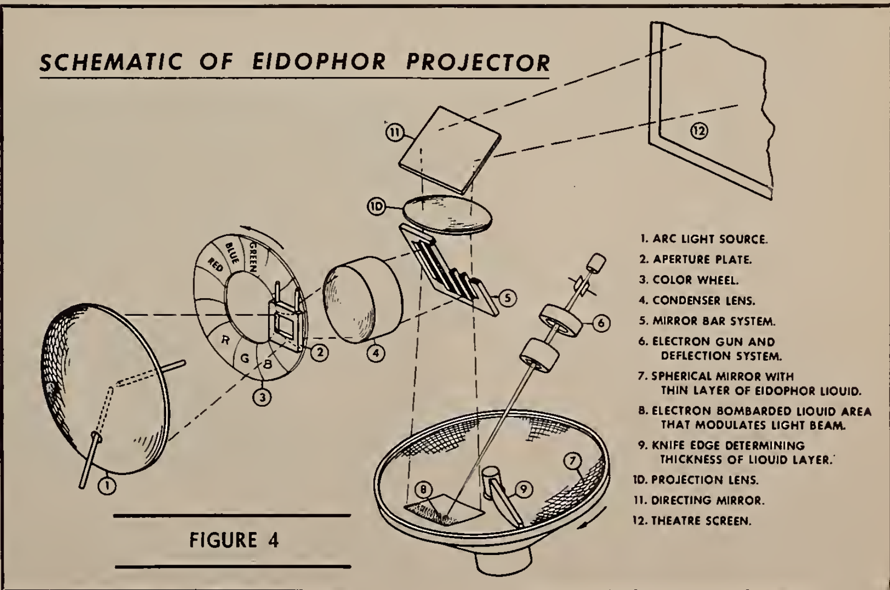


FIGURE 4

IN THE SPOTLIGHT

As THIS issue goes to press some thousands of IP readers are checking their reservations and getting ready to pack their bags for the 41st IA Convention, which will be held in Minneapolis the week beginning August 4. A record-breaking attendance is expected. and the various IA Local Unions in Minneapolis have organized a committee headed by William Donnelly (Local 13), chairman, and Al Kuiper (Local 219), co-chairman, to make the delegates' visit as pleasant as possible.

This 41st IA Convention can be expected to produce top-level labor statesmanship, for it has difficult problems to face—the combination of threat and opportunity offered by Tv being only one. These problems will be faced and dealt with adequately, for the IA has proved before that it is capable of developing labor statesmanship of the highest order.

• The Rhode Island State Federation of Labor will hold its 52nd annual convention at the Narragansett Hotel, Providence, R. I., October 4-5 next.

• William Cart, business representative for Local 712, Owensboro-Henderson, Ky., was recently elected treasurer of the Owensboro Central Labor Union.

• Five members of the IATSE were elected vice-presidents of the Union Label Trades Department, AF of L, at the New York State Convention which was held in Rochester, N. Y., May 15-17. They are Joseph R. Vecchio, Sr., Rochester Local 253; H. Paul Shay, secretary, District No. 10; Thomas Murtha, Brooklyn Local 4; William H. Maxton, Syracuse Local 376, and Earl Tuttle, Binghamton Local 396.

• A threatened move to bar film workers from unemployment insurance when out of work is being fought by the Hollywood AF of L Film Council. The Council, which represents 25,000 workers in the motion picture industry on the West Coast, has called on all organized labor in the state of California to help combat this threat. The Council contends that a special commission appointed by California's governor is expected to recommend to the legislature changes in the wording of the State's Unemployment Act. It is said that the industry workers would not be named in the proposed recommendation but that by a change in the eligibility wording they would be barred from unemployment benefits.

• The Minnesota State Federation of Labor has set up a scholarship program at the University of Minnesota for the children of trade union members. Sons and daughters of members of trade unions affiliated with the Minnesota Federation for at least three years are eligible. Applicants must have grade averages during the senior year of B or better.

• The Tri State Ass'n, which is comprised of IATSE Local Unions in western Pennsylvania, W. Virginia, and Ohio, held its 28th annual convention last month in Pittsburgh, Penna. More than 150 delegates and guests attended the banquet and business sessions. IA President Richard F. Walsh made the principal address. Paul P. Mach, president of Pittsburgh Local 171 opened the program.

• James V. Sipe, business representative for Local 171 was elected secretary-treasurer of the Association to succeed the late F. P. McCoy, whose death was reported in these columns last month.

• John Diehl, member of Boston Local 182, is now chief mate on the *S. S. Union Sulphur*, a merchant marine vessel running from New York to the West Coast. Diehl was formerly chief projectionist at the Scollay Square Theatre in the heart of Boston, and when the theatre was shuttered several months ago he returned to his old love—the merchant marine.

• Orin M. Jacobson, 8th IA vice-president, member of Tacoma Local 175, has been called in to settle the differences between the distributors and film exchange Locals B-71 and 72.

• For the past 22 years, Larry Shafer, member of Cleveland Local 160, has played a prominent role in the activities of the "160" Bowling League. Back in 1930 he conceived the idea of forming a bowling league among the members of the Cleveland Local. This quickly "caught on" with the members and today the "160" teams, which are generally sponsored by dealers and manufacturers of motion picture equipment, are rated high in bowling circles. The teams roll weekly from October to May and often compete with each other.

A highlight of the bowling season is a ten-game match between the Local 160 teams and the Nightingale Club of Detroit Local 199. This is usually followed by a banquet at which prizes are awarded to winners of the various events.

The present officers of the "160" League are A. T. Smart, president, and Larry Shafer, secretary.

25 Years Ago—July, 1927

• The General Executive Board held its midsummer meeting at IA headquarters, 1440 Broadway, New York City. . . . Assistant IA President Harry Dignam entered the hospital for surgery. IA Representative L. Krouse took over pending Dignam's absence from the office. . . . The Union Labor Life Insurance Co., owned and controlled by organized labor,

CLEVELAND LOCAL 160 BOWLERS WIN 1951-1952 CHAMPIONSHIP

Sponsored by National Theatre Supply Co.'s Cleveland branch, these members of the "160" Bowling League won the 1951-1952 bowling championship by winning 57 out of 78 games. The winning players shown here are, left to right: Floyd Weber, Joe Buzek, Andy Zill, captain; Fred Lone, and Ed Hutchins. A 10-game match with Detroit's Local 199 featured their season.

TORONTO LOCAL 173 RECREATION CLUB AWARDS TROPHY TO BOWLING CHAMPIONS

Arthur Milligan (third from left), business representative, is shown presenting the Local 173 bowling trophy to James Farrah, captain of the winning team. Smiling their approval are (left to right): R. Curry, H. Jarmain, Milligan, Farrah, E. Cooke, and, W. Hulse.

formally opened its offices in Washington, D. C. . . . Warning was issued against an imposter giving the name of Emery J. Lesser, who claimed to be a Fox cameraman and a member of Philadelphia Local 307. He presented a phony card to the secretary of Local 396, Binghamton, N. Y., and requested his assistance in cashing a check. Fortunately, his request was refused and a wire from Local 307 confirmed the suspicion that this man was not a member of the Local and was an imposter. The real Emery J. Lesser was a responsible business man from Warren, Penna., and was a member of Warren Local 296. . . . IA President Canavan granted permission to Local 617, Greenville, Miss., to appeal to IA Local Unions for financial assistance to help relieve the distress suffered by its membership in the recent flood disaster.

• P. A. McGuire, friend of projectionists everywhere, and author of the slogan "Better Projection Pays," phoned his old friends at IP recently and we had a pleasant chat rehashing old times. Although 77 years old and long retired from his active duties with International Projector Corp., Mac sounded as chipper and sparkling as ever—an old soldier who refuses to fade away.

IPC's Enthusiast for Better Projection, P. A. McGuire

• Local Unions are a valuable cog in the success or failure of the 1952 voter registration drive by labor organizations. This is the opinion expressed by the officers of Labor's League for Political Education. Among the recommendations made by LLPE officials for conducting a voter registration campaign is one suggesting that the rolls of a Local Union be checked against the city registration records. It would then be a simple matter to find out which trade unionists are registered voters.

• Speaking of bowling, the Toronto Projectionists Recreation Club of Local 173, recently wound up its activities of the season with its third annual banquet and dance. More than 150 members and their wives attended the affair, which was highlighted by the presentation of the 1952 Local 173 trophy to the captain of the winning team, James Farrah.

• The New York State Association will hold its 40th anniversary celebration on the 16th of this month at the Moose Club, Rochester, N. Y. Elaborate plans have been formulated to make this one of the outstanding affairs of the Association.

• The horse drawn by Solly Cohen, member of Toronto Local 173, in the recent Irish Sweepstakes romped home with the bacon and Cohen today is richer by $140,000. We understand that he has had rather phenomenal luck in picking winners in three successive sweepstakes —in two of them the horses he picked were scratched and he won $500; in the third he was one of the four big winners.

• The Michigan Alliance, IATSE, held its quarterly meeting last month at the Labor Temple in Detroit, Mich.

IA-IP Amateur Radio Bulletins

By AMOS KANAGA, W6BAA

Secretary, Local 409, San Mateo, Calif.

BELIEVE me, fellows, no one of you could have received more of a kick than I did out of the terrific increase in our IA-IP Ham Listings that the big spread showed in the May issue of IP. We keep a pretty doggone accurate record of you fellows in a big grey looseleaf book, (it used to be a small folder) and while I was cognizant that we had a big increase, seeing it actually in print . . . WOW!

NEW IA-IP 'HAM' LISTINGS

W1GR	Al Hyde—L. 223
W1GND	Wilbur Tracy—L. 437
W4JIC	Chet Ruffner—L. 264
W5IB1	William Armstrong—L. 183
W5PBA	Hulon Byrne—L. 540
W6MBD	Harry M. Leonard—L. 695
W6VSP	Everett Brown—L. 695
W6COF	Harold Steck—L. 695
W6RGJ	Don Fay—L. 695
W6UMZ	John Steurhoff—L. 159
W6FMG	Fred Kienle—L. 165
W6KP	Ollie Garretson—L. 695
W6EJH	Jack F. Lilly—L. 695
W7HIZ	Fred Olson—L. 255
W7KBD	Earl Tosland—L. 180
W7COZ	Leslie Cowan—L. 446
W8ZNO	Ken Rowe—L. 776
WφSWM	Earl Leonard—L. 695
VE3BZJ	L. R. "Slim" Kilbourne—L. 622
VE3DFK	F. Barkey—L. 173

The list is really something, but now that we have successfully under way the very popular IA-IP Achievement Awards in the "Worked 10 IA-IP" and the prized "GOLD AWARD Worked 25 IA-IP," we really are busy. Thanks again to IP and President Dick Walsh, the certificates are now rolling along in fine order —practically no delay when your log of IA stations worked is received. (See May issue of IP for all data.)

Now that IP has graciously conceded a monthly column for us, let's not forget that it takes YOU radio men to supply the material to keep this alive.

Amongst our gang are quite a few who are handling Far East GI traffic, regular relayed messages and phone patch. Well, some of the IA gang on the West Coast need several Eastern relay points to pass the stuff along; as you all know the way the bands are, it's almost impossible to push it directly through from far Pacific, Japan etc. We have a rather unique set-up with several

IA-IP "BOX SCORE"

"Worked 10 IA-IP"

#1	W4PKT	Marion Sanders	Loc. 507
#2	W1BVB	Don Fancher	Loc. 439
#3	W6BAA	Amos Kanaga	Loc. 409
#4	VE7ALW	Merle Wilson	Loc. 348
#5	W6PFF	Frank Champlain	Loc. 150
#6	W6FOP	George Abrams	Loc. 297
#7	W6MU	A. Houston Barnett	Loc. 695
#8	WφGSW	James Evans	Loc. 242

"Worked 25 IA-IP"

#1	W6PFF	Frank Champlain	Loc. 150
#2	W6MU	A. Houston Barnett	Loc. 695
#3	W6BAA	Amos Kanaga	Loc. 409
#4	W6DDQ	Phillip Wisdom	Loc. 695
#5	VE7ALW	Merle Wilson	Loc. 348

Note: If your call and name does not appear this month log received too late to verify. Send all log copies to W6BAA Amos Kanaga 262 La Casa Avenue, San Mateo, California.

of the boys in the deal, where we take the actual voice of the GI and tape-record it, playing it back to the Eastern "W" station which phone patches it to the family. Of course this is only "one way" but they sure get a kick out of hearing the GI's voice. Naturally there is plenty of regular traffic too, so those of you who can spare some time let us know. If you are tied up with CD or Red Cross be sure and pass that along as well.

Award Contest Hot

You will notice quite a few more Achievement Award winners in the box this month and if yours is applied for and not there yet, don't worry, it will be next time.

Here and there: W6PFF OM Frank Champlain of Local 150 is in a dead heat with the gang to see who will work the MOST IA fellows this year . . . yep, the secret is out, we are going to try and promote some really nice prizes for the top three. . . . We wish you luck, Frank, but take a look at the Gold Award winners, W6MU Houston Barnett of Local 695; W6DDQ Phil Wisdom also of 695 . . . and don't underrate those "Worked ten" Chaps, you should see the "additions" they are shooting in. Any day brings surprises and the last guy you would think comes through with a new big list of IA men worked. You Doug, W7AXY of Local 91 in wild Idaho, if you ever came through with a complete log . . . well. And I hate to admit it, but you VE's and other districts than W6 are really starting to cut into the W6 gang on IA QSO's . . . well, keep it up!

Dashes and Dots

Congrats to W8IG Frank Riley of Local 160 in getting his old original two letter call back; and VE3BZJ Slim Kilbourne Local 622 along with VE3DFK Barkey of Local 173, we are glad to finally have you with us . . . now get those awards!

Ten A.M. Pacific Daylite Time Mondays is QST and ragchew time on about 28,700 and if ten dead 14,270 . . . as ten is perking up on short and medium skip the IA-IP General calls can be resumed. The IA boys are co-operating on the ten meter propagation tests this summer so join the gang for the tests and ragchews. On 75 any night after midnite look around 3950 for the gang.

We have more to chew over than other hams who are not united by such ties as common IA membership or common craft interest. In addition to comparing our ham rigs we can—and some of us do—compare the booth equipment we work with at times when the need to satisfy the tax collector draws us reluctantly away from the airwaves.

73 for now fellows and anything you want to know drop us a line . . . or give us a call over the air.

IP LETTERS TO THE EDITOR

To the Editor of IP:

The question I have in mind pertains to the proper threading number to use when threading a reel into a projection-machine. I have come across projectionists who use various footage numbers and when asked why that number in particular answer they have used it for years and just continue to do so.

I realize it all depends on how fast the motor picks up speed to attain the normal speed of 24 frames per second, but I have noticed projectionists varying the footage number when threading the same machine.

Therefore, would appreciate the proper threading point which should be used with the Simplex X-L, Simplex E-7 and Brenkert projectors. Also, was there ever established a definite footage number to thread on regardless of the type of projector?

Here in these post theatres projectors used are Simplex E-7 and Super Simplex and the footage used to thread is nine, or in some cases a chance is taken on ten. Sometimes the changeover that follows is perfect, but this will not happen at all times, which leads me to believe the cue marks are not always properly printed into the film.

SGT. HARRY F. FLIDER
Camp Carson, Colo.

P. S. Has IP ever made a survey to determine which projectors and arc lamps are best in operation, durability, economy and preference of projectionists?

Ed. note: The Army and Air Force "Projectionist's Manual" states: "The starting point will depend on the starting speed of the machine . . . will usually be near the 8- or 9-foot mark on the standard leader . . . The location of this point must be determined by trial . . . when no audience is present." These Army instructions are, of course, identical with civilian practice.

There cannot be any "definite footage number to thread on regardless of the type of projector used." The threading requirement will vary not only with the make of projector but also with its age and condition; and in some cases even with temperature. It is possible that your trouble may lie in variable starting time of your projectors rather than in the film. You might check this possibility with a stopwatch. As for the cue marks not being properly printed on the film, you can easily determine that: according to American Standard Z22.55-1947 (IP for May, 1952, Page 6) the last motor cue mark and first changeover cue mark should be exactly 10 feet and 12 frames apart.

IP has never made the survey you suggest to determine which makes and models of equipment are "best" because that would be a matter of opinion only. A survey of the preference of projectionists would be meaningless because few of them have had the opportunity of extensive experience with all makes and models.

To the Editor of IP:

Anent the current controversy* over masked and maskless screens it would seem that the question of unmasking a screen should not arise in a theatre unless it is planned to integrate the entire front of the house into a suitable sur-

(*Continued on page* 32)

16-mm

BECAUSE EXPANSION OF 16-mm ACTIVITY PROVIDES INCREASING FIELDS OF EMPLOYMENT FOR SKILLED PROFESSIONAL PROJECTIONISTS IN Tv STUDIOS AND NON-THEATRICAL SHOWINGS, AS WELL AS ENHANCED POSSIBILITIES OF PERSONAL BUSINESS VENTURES, THIS NEW DEPARTMENT OF IP WILL APPEAR MONTHLY HEREAFTER.

Bell & Howell 202 Series Projectors

Continuing IP's review of the outstanding characteristics of modern 16-mm magneto-optical mechanisms.

FILMOSOUND 202 is the trade-name given a series of sound projector mechanisms by Bell & Howell Company, all of which are generally similar and adequately represented by the accompanying photographs. There are different models in the series—for example, model 202-C has a built-in (but removable) 6-inch loudspeaker while model 202-B has a 12-inch speaker in a second carrying case. Some speakers are equipped with a "Cordomatic Unit"—spring-controlled speaker cord reel. Filmosound 202-B3 and 202-B6 models each have a 25-watt audio amplifier in the speaker carrying case. Accessories also vary; and include several types microphones, a disc record player, projector pedestal, series of lenses and etc.

Basically, however, the 202 projector is the mechanism pictured in Figure 1. Film passes through the mechanism from the upper reel to the take-up reel at the rear (left). Film path is shown on the threading-guide diagram on the inside of the open door. The incandescent projection lamp is inside the ribbed vertical cylinder toward the rear of the mechanism. The amplifier is at bottom, center; when it is removed for servicing the mechanism is laid over on its (non-operating) side; and the amplifier, its holding screws having been removed, is pulled out through the bottom.

In Figure 1 simple maintenance equipment can be seen inside the open door—lubricating oil, film path brush, and spare fuses. An extra take-up belt is also standard spare equipment.

A hand microphone can be seen resting on the table just behind the projector (under the take-up reel) in the same illustration. Because of the ease of magnetic recording on properly stripped 16-mm film, microphones are widely used with modern magneto-optical 16-mm mechanisms—in fact, the possibility of using them to create and edit soundtracks at will is one of the main advantages of these new 16-mm projectors.

These Filmosound 202's will: (*a*) project silent 16-mm film; (*b*) project and play sound optical track 16-mm film; (*c*) project and play sound magnetic track 16-mm film; (*d*) erase existing sound from magnetic track film; (*e*) record new sound track on erased magnetic track film; (*f*) serve as a film recorder (without pictures) by recording and playing back magnetic tracks, and (*g*) serve as a public address system to play magnetic tracks or (with suitable accessories) disc records or microphone speech.

Wide Range of Usefulness

A device of such versatility evidently must have a very wide range of uses. The addition of magnetic sound to 16-mm equipments has contributed greatly to increase their usefulness and expand the whole field of 16-mm operations.

Sales films on 16-mm have long been known; but with magnetic in addition to optical track, with the former erasable and alterable at will, the sales representative can alter his verbal presentation to match the nature of his audience. For example, at a convention of his own company's salesmen or dealers he can record a pep talk on the track; for an audience of customers, a sales talk, and so on.

In educational or religious work dealing with children the identical picture presentation can be accompanied by a specially-recorded track (perhaps made by the teacher only a few minutes before the showing) in which explanatory or lecture material accompanying the pictures is adapted to age or previous preparation of the class.

In the "half-track" 16-mm prints the magnetic strip, the sound of which can be erased, edited or replaced as desired, covers only half the optical track (which of course is unchangeable). With such prints, the user can play either the unalterable original optical track or the revised, edited, magnetic one, according to the nature of the audience and needs of the occasion.

The usefulness of such arrangements, in comparison with the older 16-mm sound films which were no more editable than a theatre's regular 35-mm prints, is obvious.

Figure 2 presents a close-up of some of the simple control arrangements. Hidden behind the hand-held microphone in Figure 2 are two toggle switches. These can be seen in Figure 1. The left switch controls the power to the projection lamp; the one at the right is the AC line switch. All other controls are more plainly seen in Figure 2.

The "direction" switch, directly above the microphone in Figure 2, reverses the film direction; at the opposite side of the projection lamp base is the speed switch that provides a choice between 16 frames-

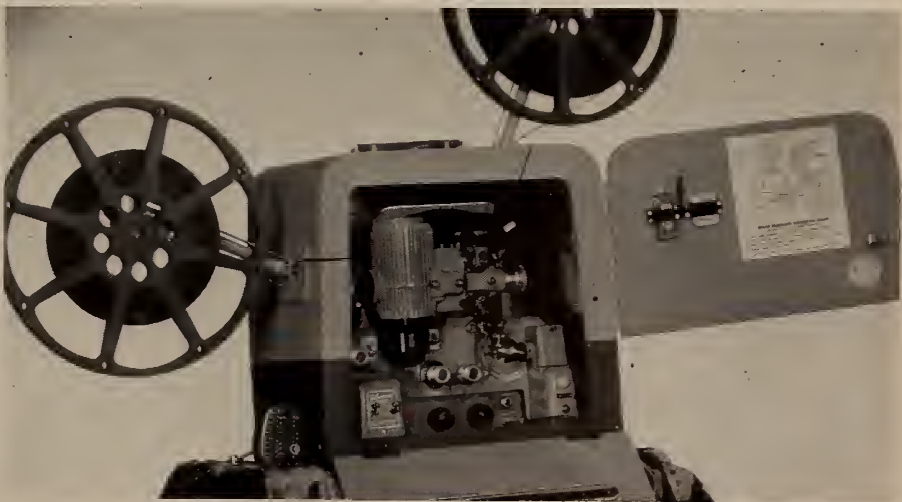


FIG. 1. The Bell & Howell Filmosound 202 16-mm optical-magnetic recording projector.

per-second (silent) and 24 fps (sound) speeds.

To the right again and somewhat below the speed switch are the magneto-optical "sound control" and locking levers. The former is indicated in the illustration by a printed call-out but is not plainly visible. The latter is not indicated but readily visible—it extends downward just to the left of the designation "MAG.".

Mechanical choice between magnetic and optical operation is afforded by the sound control lever and its associated locking lever; the corresponding electrical choice is provided by the double knob on the amplifier panel immediately below. The inner, or sound selector, knob can be set in any of three positions: magnetically record, magnetically play and optically play. The outer knob on the same shaft controls microphone volume when recording. The volume control used during playing is left of this; the recording level indicator light at extreme left of the amplifier panel.

At extreme right of the amplifier panel are two jacks; the lower for external microphone (shown in use) and the upper (shown not in use) for external phonograph. Microphone and phono sound can be mixed, phono volume being controlled by the volume control on the record player.

Record-Erase Devices

To right of the amplifier panel in Figure 2 and on the same level with it, are the record indicator light and record button (shown with finger pressing it). These devices relate only to magnetic recording (the only kind of which the mechanism is capable; it can neither photograph nor develop optical tracks). In magnetic recording, the track on which sound is to be placed must first be cleared of all accidental or intentional magnetism and presented completely and totally demagnetized ("clean") to the magnetic recorder. For this purpose it is passed through a magnetic eraser—a flux field of super-audible frequency. (A watch that has been accidentally magnetized is restored to usefulness by similar treatment). This necessary ability of the mechanism to erase magnetic tracks might by accident or through meddling destroy irreplaceable recorded material. Hence precautions are built in: the record-erasing facility will not function unless the "record" button is pressed, and the "record" light warns when it is functioning. If for any reason the mechanism is stopped or reversed an automatic interlock disconnects the recording-erase facility and it will then not function again until the "record" button is once more deliberately pressed.

(A further protection against accidental erasure of magnetic records is

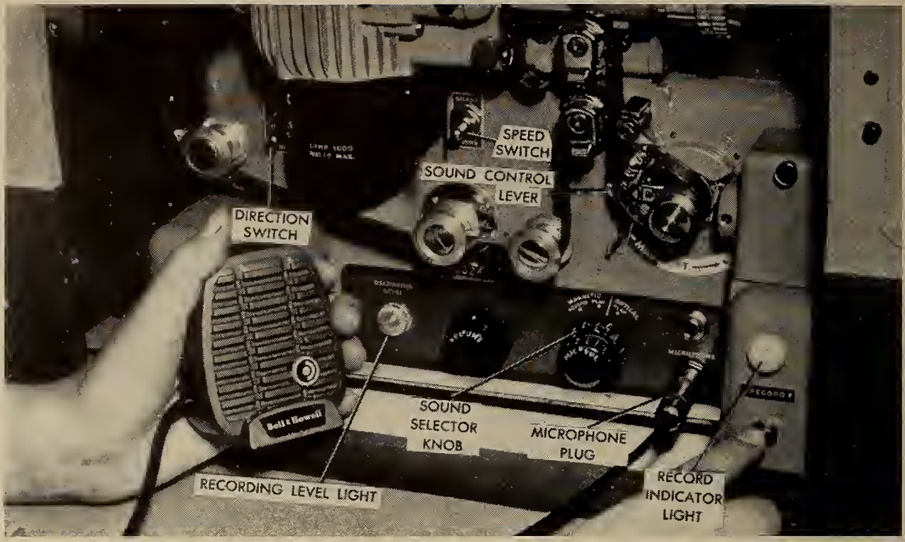


FIG. 2. Close-up view of the principal operating controls and microphone of the Bell & Howell Filmosound 202 16-mm optical-magnetic recording projector.

an accessory unit, a record-erase lock and cap. The cap fits over the record button and has an ordinary lock and key. When it is locked in place no one can touch the record button until the holder of the key comes along and unlocks and removes it.)

The exciter lamp is located inside the unit shown just above the "record" button and light unit in Figure 2.

The photoelectric cell is mounted in a socket at the front-right corner of the amplifier. Exciter light passing through the soundtrack is deflected to the photocell along the inside of the film drum.

An instruction book accompanying the equipment gives complete information on the detail of setting it up for operation, plugging in the line power and speaker cables (when the latter is necessary); setting the reels and reel arms in place, and such similar processes necessary to put the mechanism into operation. Manipulation of all controls for projection, for sound from optical track, sound from magnetic track, recording magnetic track, and use of the equipment as a public amplifier system, is explained in the instruction book at adequate length and often with help of thoroughly informative illustrations. Figure 2 is a type of the illustrations provided; there are approximately 23 others equally detailed and labelled.

The operation and elementary maintenance of the Bell & Howell Sound Projector for 16-mm film can also be learned from 16-mm film! There is an instructional sound reel giving very detailed information which can be rented from International Film Bureau of 57 E. Jackson Boulevard, Chicago 4. This print shows a projectionist setting up, adjusting, operating, readjusting, lubricating, cleaning and otherwise maintaining a Bell & Howell 16-mm mechanism.

Maintenance instructions given in that film, or in the B. & H. instruction book, do not, however, go into very great detail. The instruction book shows (with illustrations) how to remove the amplifier so tubes (including the pec) can be replaced; but does not deal with any other amplifier repairs nor even provide a schematic.

Opening the gate for cleaning, replacing the projection lamp; lubricating; replacing belts, pilot lights, exciter lamp, fuses, amplifier tubes and pec—these procedures plus a lens table substantially exhaust the maintenance instructions supplied by the manufacturer. No data on replacing mechanically worn parts, for example, (other than replacing belts) is included; just as there is none on repairing amplifier faults other than defective tubes. The Bell & Howell policy in such matters is explained by their Department of Public Relations in relation to the "Lifetime Guarantee" under which their products are sold; this guarantee is void "If equipment has been serviced by other than a B. and H. authorized service station."

New Pamphlet on 16-mm Projectors

RCA offers a new 12-page illustrated pamphlet describing the Model "400" Senior and Junior 16-mm sound film projectors. Cartoons and animated line cuts are used to explain outstanding design features of the mechanisms. The pamphlet, one of several recently issued to advertise RCA technical products, can be obtained by writing to the Visual Products Section, RCA Victor, Camden, N. J., and asking for form 2R-8305.

New Catalog of 16-mm Films

Bailey Films, Inc., has issued a new 52-page catalog of 16-mm films available for rental. Free copies can be obtained by writing the company at 6509 De Longpre Avenue, Hollywood 28, Calif.

Accepted Standards for 16-mm Projection*

Standards exist and are necessary in the 16-mm projection field as well as in 35-mm. Some of the 16-mm standards of practical interest to projectionists are presented here.

STANDARDS are as necessary in 16-mm as in 35-mm projection. Films of every origin must be capable of running on any projector. The sprocket holes must fit the sprockets, the soundtrack must run through the path of the exciting light; the shape of the frame on the print must correspond to the shape of the aperture in the machine, etc. In fact the film width, 16-mm, is itself a standard.

These standards, like those for 35-mm, are often developed by the Society of Motion Picture and Television Engineers for approval by the American Standards Association, and are used by film manufacturers and equipment manufacturers as specifications to which both film and equipment must conform.

The work of standardization is far from complete, and never will be completed as long as improvements are made and new devices invented, since these too often need to be standardized. As an example, at this time, when magnetic sound on 16-mm film is still very new, there are as yet no accepted standards either for the placement of the magnetic track, or for its width, or for the quality of its sound. Work is being done on this problem; in due time standards will be drawn up, discussed, modified, tried, criticized, altered and eventually accepted. When that has been accomplished every magnetic-track 16-mm print will be playable on every 16-mm projector and will produce approximately the same quality of sound in every case.

Sixteen-mm standards that have been through the mill and gained acceptance in the past are the ones presented here.

FIG. 1. Resolution test pattern (x 100 diameters)

Method of Determining Resolving Power of 16-mm Projector Lenses (Z22.53-1946)

1. Scope and Purpose

1.1 This standard describes a method of determining the resolving power of projection lenses used in 16-mm motion picture projectors. The resolving power shall be measured in lines per millimeter.

2. Test Method

2.1 The lens to be tested shall be mounted in a special test projector. A glass plate test object, carrying patterns of lines, shall be then projected upon a white matte grainless screen located at such a distance from the projector that the projected image of the border of the test object measures 30 x 40 inches. The resolving power of the lens is the largest number of lines per millimeter in the test object pattern that an observer standing close to the screen sees definitely resolved in both the radial and tangential directions. Lines shall not be regarded as definitely resolved unless the number of lines in the image is the same as the number of lines in the test object.

2.1.1 The patterns of lines shall consist of parallel black lines 2.5/X mm long and 0.5/X mm wide with a clear space 0.5/X mm wide between the parallel lines, where X equals the number of lines per millimeter.

2.2 Care shall be taken to insure that the screen is perpendicular to the projection axis and that the lens is so focused that the image of the center of the test plate is as sharp as possible.

3. Test Projector

3.1 The projector design shall be such that the glass plate test object is held in proper relation to the lens axis. It shall not heat the test plate to a temperature which may cause the plate to be fractured or otherwise damaged. The cone of light supplied by the projector shall completely fill the projection lens.

4. Test Object

4.1 The glass photographic plate used for making the test object and the lens used in making the reduction of the master test chart shall have sufficiently high resolving power to insure clear definition of all lines in the patterns on the test object.

4.2 The photographic reduction of the master test chart shall be such that the test object border has a height of 7.21 mm (0.284 inch) and a width of 9.65 mm (0.380 inch) with a radius of 0.5 mm (0.02 inch) in the corners, and such that the sets of lines in the reduced image are spaced 20, 30, 40, 50, 60, 80, and 90 lines per millimeter.

4.3 The patterns on the test object shall be in accordance with Fig. 1.

4.4 The position of the test patterns on the

FIG. 2. Resolving power test object (x approximately 15 diameters). The triangular edge patterns are to facilitate alignment of test plates in the projector.

* American Standards Association

test object shall be in accordance with Fig. 2.

4.5 Identification of the positions of the test patterns on the test object shall be in accordance with Fig. 3.

FIG. 3. Identification of test patterns in frame area. When using a 2-inch focal length lens, *B* coresponds to 2 degrees from the axis; *C* corresponds to 4 degrees from the axis; *D* to 5 degrees from the axis; *E* to 6 degrees from the axis, and *F* to 3 degrees from the axis.

3000-Cycle Flutter Test Film (Z22.43-1946)

1. Scope and Purpose

1.1 This specification describes a 3000-cycle sound test film for use in determining the presence of flutter in 16-mm sound motion picture projectors.

2. Test Film

2.1 *Recording.* The test film shall have either an originally recorded, direct-playback positive variable-area sound track or an originally recorded variable-density sound track developed as a toe record. The recorded frequency shall be within ± 25 cycles of the nominal 3000-cycle frequency. The modulation of the recording shall be 80 ± 5 percent. The output level of the film shall be constant within ± ¼ db. (This is equivalent to an amplitude tolerance of ± 0.0015 inch when recording variable-area sound track with a nominal amplitude of 0.055 inch.) The recording shall be accomplished in a recorder so constructed as to keep the flutter content to the absolute minimum consistent with the state of the art. The total rms flutter content of the film shall be less than 0.1 percent upon shipment by the test film manufacturer. The wave-form distortion of the recording shall not exceed 5 percent.

2.2 *Film Stock.* The film stock used for the test film shall he cut and perforated in accordance with the American Standard 16-Mm Sound Motion Picture Film; Cutting and Perforating for Negative and Positive Raw Stock, Z22.12-1941, or latest revision thereof.

2.2.1 *Resistance to Shrinkage.* The film stock used for the test film shall have a maximum lengthwise shrinkage of 0.50 percent when tested as follows: At least 20 strips of film approximately 31 inches in length shall he cut for measurement of shrinkage. After normal development and drying (not over +80 F [+26.7 C], the strips shall be placed at least ¼ inch apart in racks and kept for seven days in an oven maintained at +120 F (+49 C) and a relative humidity of 20 percent. The strips shall then be removed, reconditioned thoroughly to 50 percent relative humidity at +70 F (+21.1 C), and the shrinkage measured by an adaptation of the pin-gage method outlined in Research Paper RP-1051 of the National Bureau of Standards. The percent shrinkage shall then be calculated on the basis of deviation from the nominal dimension for the length of 100 consecutive perforation intervals given in American Standard Z22.12-1941, or latest revision thereof.

2.3 *Standard Length of Film.* The standard length of the flutter test film shall be 380 feet.

2.4 *Leader and Trailer.* Each test film shall be furnished with a suitable leader, title, and trailer.

[TO BE CONTINUED]

Magnetic Sound on Old Prints

Magnetic soundtracks can be stripped onto old single-perforation, 16-mm Kodak prints, Kodachrome or black-and-white, silent or sound, Eastman Kodak Company announces. The service is available immediately. In the case of sound prints the magnetic strip can be applied either over half the width of the optical soundtrack or over the entire track, as desired. The magnetic coating can be stripped onto prints photographed at either sound or silent speed. It is always applied to the side of the film toward the projector lamp.

There is, of course, no sound in these magnetic tracks; the owner of the print records his own. Sixteen-mm projectors capable of playing magnetic tracks are also equipped to record sound on them. (A source of sound — microphone or record-player — must be plugged in at the appropriate point.

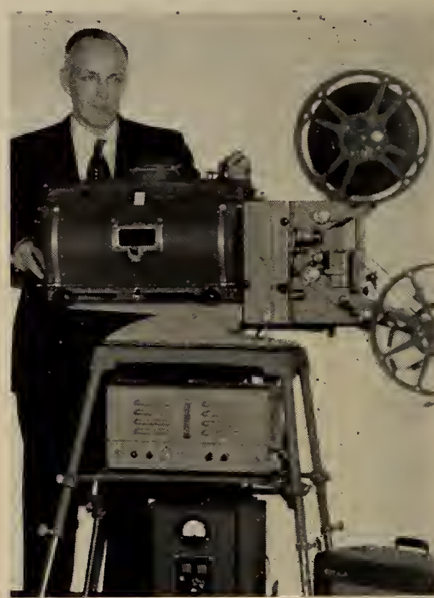
Charge for applying magnetic track to existing 16-mm prints is 3½ cents per foot, minimum order $10. The service is available through all Kodak dealers. It does not at present apply to double-perforated 16-mm film but may be extended to such stock in the future if demand warrants.

New 16-mm Curtain Control

A new curtain control and track, intended primarily for 16-mm showings, is announced by Automatic Devices Company, well known as manufacturers of theatre-size curtain equipment. The new 16-mm track, trade-named Spanorama, is available in either aluminum or magnesium. Construction follows the principle used in ADC theatre equipment of balanced rubber wheels rolling on parallel treads. Ball bearing sheaves at either end of the track and in the floor pulley facilitate curtain action.

For hand operation, Spanorama can be supplied twenty-foot lengths. For curtain openings not larger than 16 feet an electric operator, trade-named Tom Thumb, is available to control curtains at the touch of a button.

New Modified RCA 16-mm Unit



Jim Gallagher, president, Gallagher Films, Inc.

Modified by Gallagher Films, Inc., for arc illumination, dual mechanism projection, and other conveniences, the equipment here pictured embodies essentially an RCA Senior mechanism, Strong 30-ampere lamp and rectifier, and RCA amplifier and permanent magnet speaker.

Use of a 30-ampere arc in place of an incandescent lamp makes possible a brighter and larger screen image. The amplifier is modified for operation from two sound sources (for changeover) and is physically rearranged to fit in a metal cabinet as pictured, rather than in the carrying case in which it is otherwise supplied; the circuits are essentially unmodified, however, and standard RCA schematics may be used in servicing. The speaker, rated at 25 watts, has a 2½ pound permanent magnet, and is supplied in a carrying case designed for operation with the rear closed, to improve acoustic loading.

The quadruped base is not essential; rubber feet on the tilt-base of the projector-lamphouse mount protect any underlying support and permit use of the equipment even on fine furniture, Gallagher Films explains.

The power derived from any ordinary AC outline is said to be adequate to operate the entire assemblage, including the rectifier that supplies d.c. to the Strong arc lamp.

Repair parts and service data are supplied only via RCA theatre equipment dealers with approval of the RCA visual products distributor.

RCA Color Tv to FCC Again

RCA has notified FCC it intends to apply shortly for permission to test color Tv in the New York metropolitan area during commercial telecasting hours.

Such tests were banned in 1950, when the Federal Communications Commission gave its official nod to the rival color method of Columbia Broadcasting System.

The CBS "field sequential" color system is not "compatible"—that is, such telecasts cannot be received on ordinary home equipment, but only on home receivers built or modified to respond to field sequential signals. RCA's "line sequential" color Tv on the other hand is "compatible"—it will appear, on an ordinary, unmodified home receiver, as an ordinary black-and-white picture.

The renewed application for testing it during commercial telecasting hours foreshadows, in the opinion of persons conversant with the field, a possible new attempt by RCA to induce FCC to reverse or modify its previous decision in favor of the CBS method.

Meanwhile, construction of home receivers for color-video remains under restrictions imposed by the National Production Authority while construction of similar equipment for theatre use is not restricted any longer.

Theatre Color Tv Ban Lifted

"All the prohibitions previously in effect as to the manufacture of color television equipment except those relating to home-type color television" are lifted by the National Production Authority's June 24th amendment to NPA Order M-90. Home-type receivers designed for color television, and products, attachments and parts for home reception of color TV, remain under restrictions.

Altec in Oklahoma City

Altec Service Corp. is opening an office at 706 West Grand Ave., Oklahoma City, Okla. C. J. Zern, Southwestern division manager, is in charge, assisted by branch managers J. R. Brown and George LeBlanc. H. M. Bessey, Altec executive vice president, announced the development.

Hornstein, St. Louis, Sold

Joe Hornstein, Inc., motion picture theatre supply house in St. Louis, Mo., has been sold to J. W. Shreve and Paul McCarty of Shreve Theatre Supply Co., of Kansas City, Mo., and is being operated by its new owners under the name McCarty Theatre Supply Co.

Drive-In Theatre Mfg. Co. Moves

Drive-In-Theatre Mfg. Co. has moved from its former address in Kansas City, Mo., to 505 West 9th Street in the same city, to secure more room for expanded facilities.

PERSONAL NOTES

EDWARD STANKO has been appointed to the newly-created post of manager of engineering, technical products section, RCA Service Company. The appointment was announced by W. L. JONES, the company's vice president in charge of technical products. Stanko joined RCA in 1920 as a ship's radio operator; changed over to radio broadcasting; is believed to have been the nation's first disc jockey (in Buffalo, in 1927); demonstrated "scanning disc" television in Buffalo in 1928, and rejoined RCA Manufacturing Company as theatre sound engineer in 1937. He is an active radio "ham", operating station W2RHT from his home in Haddon Heights, N. J.

Appointments of J. WINTON LEMAN as manager of Eastman Kodak's photo press division, of KENDRICK O. RICHARDSON as manager of the photofinishing and school division, and ALVIN W. STREITMATTER as manager of the professional photographic division, are announced by JAMES E. MCGHEE, vice president and general manager.

ROY N. SACKETT, who retired from Eastman Kodak's motion picture film department on February 1, 1951, died last June 20 at the age of 68. He has been with Kodak since 1906 and was widely known, particularly in the Midwest and South. Surviving are his wife, daughter and three grandchildren.

KALMAN SPELLETICH, JR,. (SPEC), has been appointed assistant sales manager for Victor Animatograph Corporation, Victor's president, SAM G. ROSE, announces. Spelletich served as Victor sales representative in 1946 and for some years thereafter; for the past two years he has been sales representative for DeVry Corporation. His new duties include supervision of domestic and foreign sales of Victor 16-mm projectors and their new Magnasound recording attachments.

Kalman Spelletich, Jr., now assistant sales manager for Victor Animatograph Corp.

P. M. BUHRER and C. O. KLEINSMITH have been named executive vice presidents of National Carbon Company by its president, A. S. JOHNSON. Both have been with the company many years. Buhrer was graduated by Johns Hopkins with his B.S. in chemistry in 1923 and has been with National Carbon ever since, serving in their research laboratories, and thereafter as head of product and process engineering, product manager and assistant general manager. Kleinsmith joined National Carbon in 1914, and (with time out for military service during World War I) has been with them since, with headquarters in Dallas, Atlanta and New York. For many years he has been general sales manager in charge of consumer goods, and has been a vice-president since 1944.

C. O. Kleinsmith (left) and P. M. Buhrer

New Name for Camera Exchange

Dumont's 34th Street Camera Exchange is the new name of the photographic supply store at 150 East 34th Street, New York City. "Dumont" has been prefixed to the previous designation owing to acquisition of an interest by Harold A. Dumont. No change of address or policy has been announced.

Canada TV Sales Down

Canadians are buying fewer television receivers. In the first three months of 1952 they spent 6.9 million dollars for 13.5 thousand sets. In the same period of 1951 Canadians bought 14.0 thousand receivers at an expenditure of 7.6 million dollars.

BOOK REVIEW

TELEVISION ENGINEERING, by Donald G. Fink, 6½ x 9, 721 *pages, abundantly illustrated, indexed, cloth. McGraw-Hill Book Company, Inc., New York, Toronto, London,* 1952. $8.50.

Although it is the second edition of a work that has been standard in the Tv field since 1940, the present volume is substantially a new book throughout. Of the original 540 pages, 505 have been rewritten and 200 more added. The author, Donald Fink, is editor of *Electronics;* Fellow, Institute of Radio Engineers; Fellow, American Institute of Electrical Engineers; Vice-Chairman, National Television System Committee.

He provides an engineering (as distinguished from rigorously scientific) view of his intricate subject. His mathematical presentations (which are held to a minimum) are offered in the relatively simple final equations that guide the practical engineer and designer, avoiding the more complex theoretical derivations.

Schematic circuit diagrams and system block diagrams, photographs, and explanatory charts and graphs, are abundant. Textual presentation is as clear and simple as the nature of the subject matter permits—comparatively speaking, easy reading. The book is not, however, for the absolute beginner. The author does not take time out to explain vacuum tube action, amplification, nor elementary radio principles like modulation and demodulation; it is taken for granted that such matters are reasonably well known to the reader; attention is concentrated on details peculiar to Tv technology.

The entire field of television is covered, from camera to final image. The chapter headings indicate the scope of coverage: 1. The Television System; 2. Analysis and Synthesis of Images; 3. Cameras and Picture Tubes; 4. Scanning and Synchronization Methods; 5. Transmission of the Video Signal; 6. Video Amplification; 7. Carrier Transmission of Picture and Sound Signals; 8. Color Fundamentals; 9. Color Television Systems; 10. Television Broadcasting Equipment; 11. Television Receiving Equipment.

There is no extensive treatment of theatre television, however. Projection methods in general are touched on only briefly. The Schmidt optical system is diagrammed and explained in about one page of text. The Scophony light-valve theatre arc-lamp projector is described, with two geometric diagrams explanatory of its operation, on two additional pages. One page is devoted to film-intermediate theatre Tv, with a picture of the installation at the New York Paramount theatre. The North American Philips "lobby" projection system that produced images up 4 feet wide, is glanced at. Eidophor Tv is not mentioned. The special projector pull-down and shutter arrangements commonly used to scan 24-frame motion picture film at the 30-frame-per-second rate of television are described, and diagrammed, in connection with Tv broadcasting equipment.

To IP readers with strong electronic background—for example, readers of the IA-IP ham group and those with similar interests or attainments—who may wish to add to their mental equipment a well-rounded basic acquaintance with video technology, *Television Engineering* is strongly recommended. And it is recommended to all practicing projectionists of reasonable electronic background who have or expect to have Tv equipment in their responsibility, and want to know more about the circuit details, the what and the wherefore of the apparatus.

New 3-Speed Non-Synch Turntable

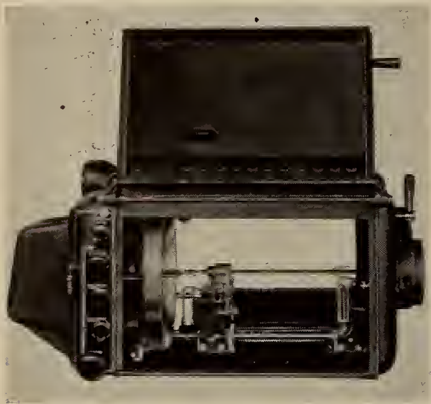
A new three-speed playback turntable suited to use for theatre curtain music and other entertainment purposes has been announced by Fairchild Recording Equipment Corp. Instant shifting to any of the three standard speeds (33.3, 45 and 78.26) is provided. Stable speed is attained within the first revolution, mechanical noise is rated 55db below reference level, mechanical vibration is filtered and further reduced by spring mounting. Turntable is 16" in diameter, driving motor 1/20 hp.

Up Use of Technicolor

Three-fourths of all their 1952-1953 productions will be in Technicolor, an increase of fifty percent over their use of Technicolor in 1951-1952, Universal-International announces.

RCA Brings Out Water-Cooled Arc

BURNING 70 to 90 amperes, this new arc lamp just announced by RCA has a water-cooled positive and delivers a rated output of 18,000 lumens. Economical operation and very stable performance are among the claims made for it. Stability of performance is promoted



RCA High-Intensity arc lamp.

by an exceptionally elaborate magnet system that produces interlaced, cooperative magnetic fields at the flame location, stabilizing the flame.

The new lamp has been trade-named RCA Hy-Arc. Its trim is 9-mm x 20″ high intensity positive and 5/16″ x 9″ negative. The reflector is 15 inches in diameter. Cool operation is promoted by the roominess of the interior. Cleaning and maintenance are facilitated by absence of any obstructions on the floor of the lamp. Controls are arranged vertically at the right side rear. Drive mechanisms, wiring and associated apparatus details are mounted on the left side of the base and protected against heat by suitable covers. Rotating parts are journaled on ball bearings or needle bearings.

A rest or guide for the negative carbon to prevent imperfect alignment is mounted to the negative carriage frame by means of heavy insulated castings.

The non-rotating positive carbon is trimmed through a water-cooled loop that is mounted close to the crater and is claimed to keep the positive head cool under all circumstances.

Magnet stabilization is effected by interacting fields. One magnetic loop, in the form of an inverted letter *U*, is located on the water jacket and energized both by current flow and by induction. Additionally, a row of electromagnets is located behind the lower part of the reflector. The one at extreme right can be seen in the illustration. Attached to the end of its core and extending upward is a steel projection. This projection, together with another like it on the opposite side of the lamp, function to center the field of these electromagnets approximately in line with the optical center of the lamp, and with the center of the flux field produced by the U loop on the water jacket. These interlacing fields of force produce the degree of stability desired and effectively prevent any tendency toward flame envelopment of the positive carbon, RCA claims.

The Hy-Arc is intended for indoor and medium-sized drive-in theatres. It is distributed through RCA equipment dealers.

Color TV Patents Total 229

A total of 229 patents have been granted by the United States Patent Office for inventions relating to color television exclusively, according to Patent Service Institute, which issues a list of them. Earliest color TV patent on the list is dated October, 1912. The latest shown was issued in August, 1951. Those interested can obtain the complete list from the Institute, 945 Pennsylvania Avenue, N. W., Washington, for a small fee. The individual patents listed can be bought from the Patent Office at 25 cents each or consulted at any large public library.

Motion Picture Industry Expands While Grosses Drop

THE U.S. motion picture industry has attracted additional investment, its advertising has increased, its capacity is greater, but attendance is down and grosses are down, according to figures presented in the just-published 1952 *Film Daily Yearbook*. In Canada, to the contrary, admissions and grosses are up. Figures in the 1952 *Yearbook* apply to 1951; and those in the 1951 edition to 1950. Thus, the comparison is between the years 1950 and 1951.

Capital invested in the entire U. S. motion picture industry is estimated at $2,931.7 millions, an increase of $9.1 million over 1950. Of this, investment in the theatre end of the industry is estimated at $2,745 millions, an increase of $5 millions over 1950.

On film advertising the industry spent, in the U. S., an estimated $68.25 millions in 1951 as against an estimated $66.75 in 1950.

Grosses and Attendance

Yet, grosses and attendance were down. The 1951 gross take (federal and state taxes excluded) was $1,278 millions, a drop of 3 percent from 1950's $1,320 millions. (All-time peak gross was $1,565 millions in 1947.) Attendance was down 10%, to an estimated 54 million weekly, against 1950's estimated 60 million weekly. (All-time peak estimated attendance was 90 million weekly in 1930, 1946, 1947 and 1948.)

Some discrepancy in figures is apparent in the fact that a 10 percent decline in attendance resulting in only a three percent decline in gross admissions necessarily indicates that the price of the individual admission must have increased; however, the *Yearbook* finds no such increase but sees total admission cost to the patron (including all taxes) at 52.8 cents in both years—an all-time high. In this connection, however, *Variety*, on June 18th, estimated the average motion picture admission at fractionally over 46 cents. (Lowest average admission cost in twenty years is 23 cents—in 1933, 1934, 1937, 1938 and 1939.)

Projection Rooms Increase

Theatres in the U. S. are fewer, yet because of drive-ins actual entertainment capacity is greater. Also, there are more, not fewer, projection rooms, again because of drive-ins. The number of theatres declined in 1951, as compared with 1950, from 19,796 to 19,048, a loss of 748. But drive-ins increased from 3,323 to 4,151, a gain of 828. Thus there were 80 projection rooms more in the U. S. in 1951 than in 1950.

Entertainment capacity also increased. *Seats* declined from 12,384,150 to 11,977,081, a loss of 407,069. But the 828 new drive-ins must have much more than made up for the difference. Although their capacity is not given, other studies in recent years have indicated that the average modern drive-in has a capacity of 400 to 500 cars; and if each car is rated as containing a potential five seats, the average seating capacity of the drive-in is roughly 2,000. Therefore 828 of them would seat 1,656,000—abundant compensation for the loss of 407,069 indoor chairs.

Yet despite this increased capacity, despite increased advertising and investment, business was down as noted.

Canada's Theatres Prosper

Expenses, of course, were up. Every industry's costs, like every individual's, reflect inflation. Craft labor in Hollywood studios, for example, was paid $76.032 millions in 1951 as against $67.622 millions in 1950. These figures were obtained by the *Yearbook* from California State Department of Industrial Relations. Estimated *theatre* payrolls, however, show no change, but are judged by the *Yearbook* to have been $201.42 millions in each year.

In Canada, admissions increased from 245.02 millions to an estimated 269.5 millions; and grosses from $86.713 millions to an estimated $95 millions; both gains being of the order of 10 percent.

And while the number of indoor theatres in the U. S. declined, from 19,796 to 19,048 (the peak was in 1929, with 23,344) the total number of indoor theatres in the whole world increased, from 95,155 to 96,070.

Eastman Kodak Pays

Eastman Kodak Company paid its 200th quarterly dividend on July 1st. The company has not missed a common stock dividend since 1893.

FOX UNVEILS EIDOPHOR

(*Continued from page* 17)

The electron gun, Item No. 6 of Figure 4, necessarily must function in a vacuum —gas in the path of the beam would become charged by the electrons and would scatter the beam. Every Tv picture tube of course encloses a vacuum in which its electron beam operates. But conventional tubes can be, and are, exhausted and sealed off in the factory. The Eidophor vacuum cannot be secured in the factory because it contains within itself a liquid that is the heart and secret of the whole operation and that will most infallibly tend to evaporate. The only way to maintain a vacuum in the Eidophor system (in spite of evaporation of the liquid) is to keep it continuously on a vacuum pump. A suitable pump is, accordingly, installed under the arc lamp alongside the refrigerating unit.

Results Obtained

Operation of the Eidophor does not appear to present any exceptional difficulties. Maintenance requirements include periodic replacement of the oily liquid (which is removed by degrees by action of the vacuum pump). How often the electron gun may need to be replaced experience will show. It does not use an oxide-coated cathode—which would be chemically destroyed by the oil vapors—but one of pure tungsten. This is heated partly by radiation from a surrounding helix, and partly by electronic bombardment from this helix, which for that purpose is given a charge that is powerfully negative with respect to the cathode.

As demonstrated in New York the Eidophor reproduced a variety show staged two city blocks away and transmitted by equalized telephone line. The image filled a 15-foot screen; was bright and clear with good color and excellent definition; and of such quality that it was mistaken by some observers for a Technicolor film.

New Rear Projection Lenses

Rear projection lenses that effect side-to-side reversal of the image without auxiliary optics and simultaneously eliminate "hot spot" have been announced by Par Products Corporation of Hollywood.

How the side-to-side reversal is achieved in the lens is not disclosed at present for reasons connected with patent law; similarly, the manufacturer cannot now reveal the patent-applied-for feature which is said to produce 90 percent center-to-side distribution of light. These data will be given to IP—and by IP to its readers—whenever the patent situation permits.

New Par Vertar 35-mm rear projection lens

The lenses were originally developed for Fanchon and Marco's rear projection theatre in St. Louis.

The 35-mm model is built for a projection throw only 1.4 times the picture width; it is of 1.2 inch equivalent focal length and rated at aperture ratio f/2.0. The 16-mm model is rated at f/1.5, equivalent focal length 0.6 inch, projection throw 1.5 times picture width. The lenses are sealed against oil and moisture and normally need not be disassembled for cleaning.

Unite to Preserve Industry's Past

Museum of Modern Art's Film Library in New York City and George Eastman House of Photography in Rochester have united their efforts to locate, acquire, study, preserve and exhibit films that are milestones in the history of the industry. Their combined collections at present include nearly every outstanding motion picture produced since the Edison and Lumiere films of 1894. These are interchanged, used in different forms of study, and exhibited from time to time to individual students, film societies, and members of this industry. Nelson Rockefeller, for the Museum, and O. N. Solbert, for George Eastman House, announced the latest agreement on cooperation between the two groups.

IA ELECTIONS

LOCAL 415, TUCSON, ARIZ.

Albert D. Runkle, *pres.;* A. J. Denny, *vice-pres.;* E. E. Mitterling, *sec.-treas.;* B. M. Osuna, *rec.-sec.;* George G. Codd, *bus. rep.;* G. E. Martinez, R. Yrigoyen, *exec. board;* E. S. Munoz, *guardian;* G. G. Codd, del. *IA Convention.*

LOCAL 509, DULUTH, MINN.

George Olson, *pres.;* Edgar Chubbuck, *vice-pres.;* Ernest Poling, *fin.-sec.;* William Call, *rec.-sec.;* Fred Danieko, *treas.;* Harold Olson, *bus. rep.;* James Milne, James B. Enochs, *exec. board;* J. Enochs, *wage scale comm.;* Walter Quick, *sgt.-at-arms;* H. Olson, *del. IA Convention.*

LOCAL 712, OWENSBORO-HENDERSON, KY.

William Drury, *pres.;* Carl Pullen, *vice-pres.;* Earl Hardin, *sec.;* William Stewart, *treas.;* William Cart, *bus. rep.;* W. Cart, *del. IA Convention;* Norman Brown, W. Cart, *del. Central Labor Union.*

Eastman House Open All Summer

George Eastman House in Rochester, N. Y., and the associated free film programs at Dryden Theatre in the same city, will continue open to the public all summer. George Eastman House is chartered by the University of the State of New York as a non-profit educational institute. Except Mondays, it is open without charge daily 10:00 am to 5:00 pm. Its exhibits include the whole history of photography, plus fine art collected by George Eastman throughout the world. The Dryden Theatre film programs are scheduled for 3:30 pm Saturdays and 2:30 and 4:00 pm Sundays. Ample free parking space is provided.

Larger Quarters for GoldE

GoldE Manufacturing Company, makers of equipment and accessory items for both 35-mm and 16-mm projection, have moved their offices and plant to new and larger quarters at 4888 N. Clark Street, Chicago 40. Increasing consumer demand plus expanded company activity in development of new products made the change necessary, President E. W. Goldberg explains.

PROJECTING TELEVISION

(*Continued from page* 13)

luckier friends within emerged to tell the story.

Projection room portions of the T-M theatre television system contain, as already indicated, only receiving, tuning and controlling apparatus and circuits. Projection apparatus and circuits, including all the high voltage power supply circuits, are built into the projection unit which is mounted in the auditorium and operates without direct human supervision, by remote control from the projection room.

The projection unit is pictured herewith. The two circular openings on its face are its two projection ports. Inside each port is a Tv picture tube on which the image is formed, and a modified Schmidt optical system that projects the image to the theatre screen. These constitute the dual-channel projector. Electronic circuits and apparatus necessary to the functioning of the two tubes (including all high voltage circuits) are in the two wings which are shown in this illustration with their tops hinged open for servicing—in all normal operation the tops are kept rigidly closed.

Photographers Convene in New York

The Photographic Scoiety of America has scheduled its 1952 convention for August 12th to 16th, at the New Yorker Hotel in New York City. Non-members as well as members of the Society are welcome to attend and are accorded all convention privileges on payment of the regular registration fees. Detailed information anent the convention program and activities can be obtained from the Society, 2005 Walnut Street, Philadelphia 3; or from J. A. Bernstein, Chairman of the 1952 PSA Convention Publicity Committee, 80 Madison Avenue, New York.

LETTERS TO THE EDITOR

(*Continued from page* 20)

rounding for picture presentation.

Recent descriptions of "illuminated surround" installations appear to represent makeshift, superimposed stage flats, constructed cheaply for the novelty, and doing little to create the desired illusion of greater size and space.

Why eliminate the black masking if the audience is still conscious of the framed effect created by the projector aperture?

To achieve a really new and exciting effect, it is necessary to carry the screen surround clear to the sides of the auditorium, enlarge the screen image, and illuminate the surround in such manner as to minimize the line of demarcation projected from the aperture.

In this regard, there is little doubt that the French and British systems of beam splitting, and projecting the actual colors and intensities of the film to the surround, are preferable and superior.

We have experimented here with enlarged surrounds, various arrangements of wings of screen material, and neutral masking, and find that in a darkened viewing area the picture still looks masked unless there is a high level of similar light on the area immediately around it.

L. F. Adams
Trans-Arabian Pipeline Co.
Beirut, Lebanon.

** Ed note: IP January, 1952, page 16; February, 1952, page 18.*

To the Editor of IP:

It is my understanding that in televising film subjects the projectors used are the same in principle as any other 16- or 35-mm machines, the one exception being the 2-3 movement of the film intermittent.

My question is, why are the better makes of machines so very expensive? Is it the highly complicated movement of the film intermittent that runs up the cost, or are prices high because the market is limited to the 108 television stations operating in this country at present. If the latter, what is the prospect of prices coming down when the new high frequencies hit the air?

J. Raymond Walker
Secretary, Local 587
Longview, Texas

Ed. note: Two leading makers of these projectors comment as follows:

The high cost of these projectors is partly due to the special design but mostly to the limited quantity manufactured at a time. In other words, the modifications require practically tool room methods of production. Prices could be reduced, of course, the percentage depending on whether sufficient quantities of television projectors would be required to enable proper tooling up. As you can appreciate, tool costs run extremely high and must be apportioned over the number of equipments that will eventually be sold. Even if the number of television stations were to increase threefold, this still would mean a relatively small demand for these special equipments. Therefore, frankly, I cannot see any material reduction in the price of television projectors in the near future.

* * *

Supply and demand, and the greater cost of the intermittent movement, are one or two of the answers. There are other reasons. One is that the machine has a number of features not apparent to the eye. There are tighter tolerances, and the equipment is built for heavier duty with longer-wearing parts. The special 2-3 movement makes necessary special power supplies and special motors for the synchronizing and phasing requirements of the projector.

Also, considerable monitoring and switching equipment is required, which is included in the price. Engineering costs also have been heavy. To keep up with the fast-moving TV requirements we have had to keep engineers constantly engaged in design and development. Whereas theatre 35-mm projectors are turned out in the factory in 1,000-quantities, we have never had runs of more than 50 of these Tv projectors on any one order. As to an expected drop in price when the new frequencies come into use—doubtful. Any saving arising out of greater quantity is likely to be overcome by generally rising manufacturing and engineering costs.

Milk Depot Becomes TV Studio

Huge Sheffield Farms dairy depot and office building on West 57th Street and 11th Avenue, NYC, has been taken over by Columbia Broadcasting System to be rebuilt into the largest television studio in the East, according to Frank Stanton, CBS president. Depot's floor space, originally devoted to receiving dairy products for redistribution throughout New York, measures approximately 9 acres, divided among 6 floors, 2 basements, and a roof that is large enough to receive helicopters bringing newsreels from out-of-town regions where TV cameras may not be available.

BIG FUTURE FOR THEATRE TV

(*Continued from page* 10)

Any one kind of audience is too limited in size. "We must have plays and musical comedies and ice shows for those who like entertainment, operas and ballets and concerts for the more culturally minded, news telecasts and educational features for the mentally alert. Once we have this varied range of product—and we hope that it will prove to be a wider range than Hollyood dished out during most of the years of its existence—theatre Tv will become an established part of our national way of life."

Matthews saw no difficulty in the way of obtaining such attractions. When more theatres are equipped to show video programs they can out-bid any video advertiser for any program they want. Even now, the theatres managed to out-bid the advertisers for the exclusive showing of the Maxim-Robinson fight.

At present, some Tv showings are not profitable to theatre owners because programs are so few that the telephone company's full monthly standby fee—or even several month's standby fees—may have to be paid by only one Tv audience. But as theatres come to play more Tv programs that same monthly rate will no longer seem large. And as more theatres participate in showing long distance programs the long distance rates, divided up among a number of participating houses, will become far less important than now.

But even at present it is possible for a theatre owner to earn some profit over and above his program, standby and service costs. In the future, as a wider selection and greater number of programs become available, "theatre Tv can and will produce big profits." And the sooner theatre owners buy and install the equipment, Matthews maintained, the sooner those profits will start to flow in.

New LaVezzi Catalog

Free on request to any projectionist or other interested person, the latest LaVezzi catalog of projector replacement parts and repair tools is abundantly illustrated, attractive, and easy to follow. A price list is included.

The bulk of the catalog's 44 pages is devoted to listing parts for standard Simplex and Super-Simplex mechanisms. An abundance of well-numbered illustrations makes every part easy to identify by catalog number and name. Subsequent pages illustrate and list replacement parts for Simplex E-7 and for Century "C" and "CC" mechanisms; and sprockets for RCA, Western Electric, Simplex-Acme, Simplex-SP, Simplex 4 Star, Holmes, Ernemann and Phillips soundheads and projectors. Special sprockets for 16-mm and 35-mm cameras; developing, printing and editing machines, viewers and the like, also are presented. LaVezzi tools and conversion and repair kits are shown.

Requests for free copies of this catalog should be addressed to LaVezzi Machine Works at 4635 West Lake Street, Chicago 44.

TESMA Committee Chairmen Named

Bob Hoff, President of the Theatre Equipment and Supply Manufacturers Association, has appointed a number of committees to help in managing details of the organization's forthcoming convention. The chairmen are: W. C. DeVry, convention chairman; Oscar F. Neu, honorary chairman; Roy Boomer, convention coordinator; Lee Jones, press relations; V. J. Nolan, registration; Fred Matthews, reception; Bob Engel, TEDA liaison, and Larry Davee, hotel registration. The convention is scheduled for November 15th to 19th at the Morrison Hotel in Chicago, jointly with the Theatre Equipment Dealers Association and the Allied States Association of Theatre Owners. The prospectus calls for public exhibits of theatre equipment by nearly 150 manufacturers.

HEART OF THE PROJECTOR

(*Continued from page* 6)

of the Victorian period—the early days of the projection art—that it is difficult to decide which intermittent to discuss first. Although the first motion-picture projector (Lumiere) had a claw movement, many other projectors utilized the striker, or beater, movement.

Figure 1 illustrates this type of intermittent. In many a hand-cranked nickelodeon projector it imparted to the film the combination of sudden jerk with a long rest period for the exposure of Francis X. Bushman in a single stage of motion.

The Striker Movement

At *A* we see the "dog striker." This consisted of a flywheel with an arm or roller projecting from its side into the film-path. The roller was the striker which gave the film a vigorous *whack* at each rotation of the flywheel. Between whacks, the film-loop was shortened by a large constant-speed sprocket which was geared to pull down one frame per whack of the striker. And the pull-

down sprocket had to revolve at a *really* constant speed if the picture were to be reasonably rocksteady. Which it seldom was.

Overshooting was a common defect with this movement. But in those days people thought the film had stopped running when the image was rocksteady. The picture was a *moving* picture in every sense of the word.

In addition to vertical unsteadiness the long length of film between the constant-speed pulldown sprocket and the aperture imparted a gavot-like weaving to the image when shrinkage of the film was uneven. (It is a requirement for all intermittent movements that the pull-down mechanism, be it a claw or an intermittent sprocket, be placed as close to the aperture as possible in order to minimize vertical weaving caused by varying degrees of film-shrinkage.)

In *B* of Fig. 1 a less barbarous striker movement is shown. This was the "plunger" movement in which the flywheel worked an oscillating piston-striker for smoother osculations when patrons demanded passion with their popcorn. In some machines a piston striker was located at both top and bottom of the gate to lessen the strain on the film.

All striker movements were extremely noisy, most of the noise being caused by the *sudden* (not gently accelerated) pull-downs of the film. The only obvious advantages of the striker movement are the simplicity of design and the fact that films having torn sprocket-holes wend their jerky way through the beater with no more picture-jumping than a new print would give.

The Claw Movement

The early Lumiere machines, among other makes, used the claw movement, a type of intermittent seen today in certain makes of professional 35-mm sound-film cameras, in practically all non-professional 16-mm and 8-mm cameras, and in most 16-mm and 8-mm projectors.

The claw arrangement illustrated in Fig. 2 is a simple 1:1 movement. In any 1:1 movement the rest- and pull-down-periods are of equal duration, while in the conventional 3:1 geneva movement the sprocket is at rest 3 times as long as the pulldown period lasts. A 1:1 movement is obviously a poor intermittent for projectors, though good for cameras. (Motion-picture cameras do not need a balancing cut-off blade on the shutter.)

Ratios as high as 7:1 or 8:1, however, can be obtained with claw, or shuttle, movements of different design. The claw intermittent, while extremely accurate in action, producing perfectly rocksteady pictures, is impractical for theatre projectors because of the punishment the claw-tooth inflicts upon the film perforations.

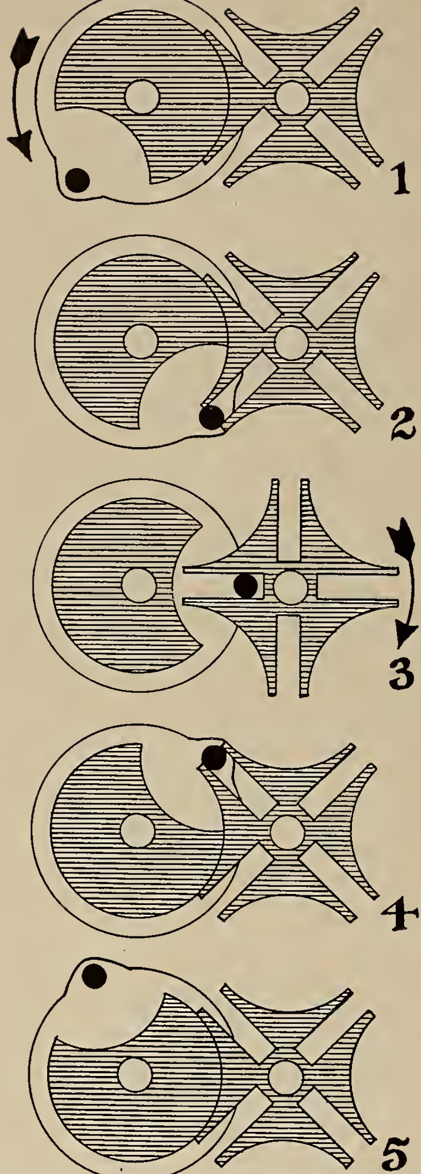


FIG. 3. Operational principle of the conventional 3-to-1 geneva intermittent movement, the standard in 35-mm projection today.

Most of the early motion-picture cameras employed claw movements, which accounts for the rocksteady registration of the picture frames photographed on the film in many old-time movies. Jumping, when it made its appearance on the screen, was often the fault of the theatre projectors, especially when striker movements were used.

The reverse is usually the case today. Unsteadiness, when present, is usually either photographed on the film by cameras not properly supported, or caused by improper printing of the positives. One major producer seldom issues black-and-white prints that are perfectly rocksteady because the laboratory that prints his release positives still uses old-fashioned step-printers left over from the era of silent pictures.

If the picture weaves and jumps *on the film*, there is nothing the projectionist can do to remedy the situation. Complaints to the distributor will do no good—he will merely point out with considerable smugness that the print ran in other theatres without eliciting complaints.

(To detect jumping of the picture *on the film*, run the offending reels out of frame so that the frame-line extends across the middle of the screen. Any movement of one half of the picture relative to the other half indicates poor printing or sloppy camera work. Jumping caused by damaged perforations or irregular shrinkage of the film cannot be detected by this test, however.)

The Power's pin-cross intermittent comes next to mind; but even before this unique and eminently satisfactory movement was invented, the familiar geneva movement had enjoyed wide use. Even the Edison Kinetoscope projector employed a geneva movement with a 4-slotted star-wheel, although driven through a system of levers to accelerate the movement during pulldown beyond the normal 3:1 ratio. The Optigraph, too, had a standard geneva movement; and in both these machines the star and cam were exposed, and had to be oiled like other gears of the mechanism.

The Geneva Movement

The geneva or maltese-cross intermittent is a device borrowed from the stop-mechanisms of Swiss music-boxes and watches made in the famous city of Geneva.

Figure 3 illustrates the principle of operation. The four concave sides of the slotted star-wheel are so proportioned that they fit snugly ("lock") against the rim of a pin-wheel (more commonly called a "cam") which carries a driving pin.

At each revolution of the cam the driving-pin enters a star-wheel slot positioned tangentially to the path of the pin. After entrance, the pin pushes the star, together with the sprocket attached to the same shaft, one-quarter of the way around. From the time that the pin leaves one slot until it enters the next slot, the star with the intermitten sprocket is motionless and locked in position.

[TO BE CONTINUED]

New Ansco Hypan

Ansco (General Aniline & Film division) has announced a new and improved version of its black-and-white Hypan 16-mm film. Features claimed for the New Hypan are blue-black image tone, clear whites, medium brilliant gradation, and increased speed (A.S.A. Index 40). Prices, which include processing, are $4.27 per 50′ roll and $7.35 per 100′ roll.

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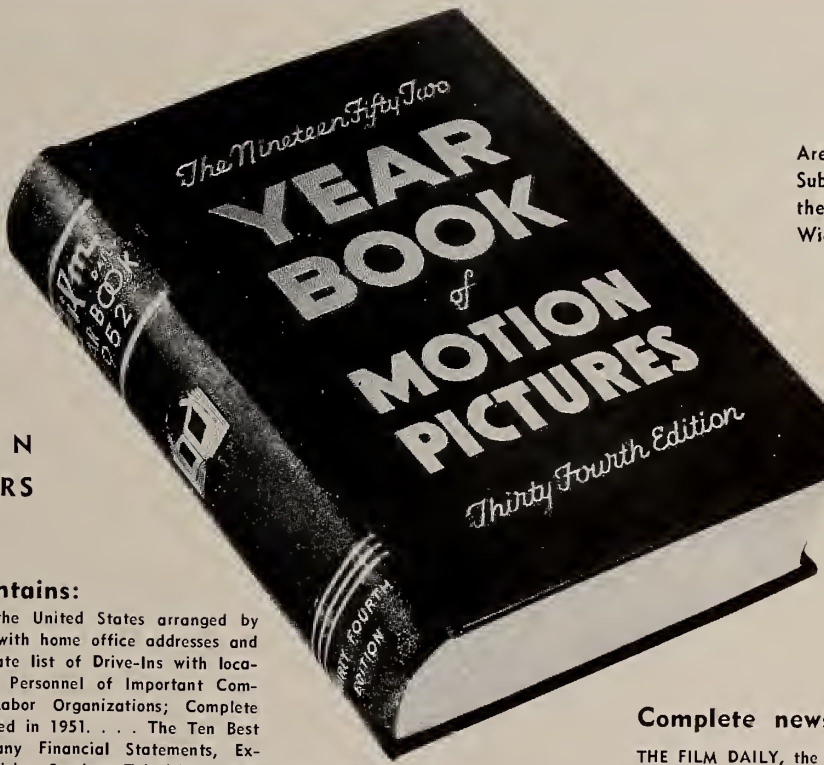

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AUGUST 1952

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MONTHLY CHAT

IN A move to promote economy MGM studios announced a cut in pay—*not* of craftsmen or white collar workers, but of top executives in Hollywood, New York, and overseas whose salaries are $1,000 per week or more.

This corner commented eight months ago (December, 1951): "What to do? Why, just take some of these terrifically inflated star (?) and executive (?) salaries, plus other monetary folerol, and plough it back into the erection of a solid technological foundation . . ."

Whether MGM will use the funds garnered by this salary-cut for technological progress or not remains to be seen, but at least a step has been taken. And it is a new step—not the time-dishonored one of squeezing the hides of the lowest-paid hired help. This is something different.

* * *

Sylvia F. Porter, widely-known writer on economics whose reflections appear daily in the *New York Post*, commented July 23 on another trend of our industry in that paper: ". . . The industry is changing, shifting away from the 'B' products toward more spectacles and more mature pictures." This is also something different. Yet logical. "B" pictures always were more a means of killing time than of rousing and gratifying the dramatic emotions. The "movies" were the poor man's (and woman's) time-killer in addition to and aside from constituting a dramatic vehicle. Now that Tv offers a time-killer even less expensive than the cheapest admission—absolutely free, in fact—the motion picture industry finds itself changing (if Miss Porter is right) to a more important, more dignified status in the national life—and to an industry in which pay cuts, when needed, are directed against those who can afford them, not those who can't.

Nor does the industry diminish in size by these changes. Miss Porter in the same column makes the point (which IP also made just one month ago—page 29) that actually there is more seating capacity in this industry today than ever before. Earnings are down, yes. But Miss Porter also points out that the earnings of the five leading film producers were down, in 1951, only 5 per cent below the 1950 level; while earnings of 808 leading industrial corporations averaged a drop of 12.3 per cent in 1951.

* * *

So a picture seems to emerge of a somewhat changed industry, having somewhat improved labor policies, having a stronger financial position than 808 leading industrial corporations, and occupying a more dignified and less chintzy position in the community. Some theatres have closed, but new ones have opened. It stands to reason, and common observation confirms, that the houses that closed were mostly ill-maintained, run-down liabilities to all of us—no great loss. The new theatres and drive-ins provide equivalent employment.

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INTERNATIONAL PROJECTIONIST

VOLUME XXVII AUGUST 1952 NUMBER 8

41st IA Convention

Theatre Industry Asks Labor for Help

SOS from management to labor sums up the most spectacular and remarkable feature of the IATSE's 41st Convention at Minneapolis, August 4th to 8th.

A goodly portion of the first three days of the five-day gathering was occupied by such appeals, which were voiced by Eric Johnston, President of the Motion Picture Association of America; by Major Leslie E. Thompson of RKO, and other exhibitor representatives. Gist of the appeals were that the industry is sick—not desperately, it was stressed, but seriously—and that labor is a partner and has a stake in the well-being of the industry.

In spite of the industry's troubles any possibility of wage-cutting or lengthening of hours in these times of rising prices were disclaimed as absurd by all the industry spokesmen who addressed the gathering; it was pointed out, however, that theatres are closing and more may close and that labor, specifically the IATSE, can help keep them open. IA members can do this, the Convention was told, by spreading the gospel that the theater is the place to go for good entertainment; by praising pictures when they deserve praise; by joining with COMPO (Council of Motion Picture Organizations) in political pressure looking toward repeal or reduction of the 20 per cent Federal admission tax (a step specifically endorsed by President Richard F. Walsh); and by exerting every effort to promote efficiency and prevent waste in theatres and studios.

The delegates were welcomed to Minneapolis by the Governor of the State of Minnesota, the Honorable C. Elmer Anderson; by the Mayor of the city, Hon. Eric G. Hoyer; by U. S. Congressman Roy Wier (who is also a member of Local 13); by the Chief of Police, Tom Jones,

IATSE Convention Hears Repeated Appeals from Industry Leaders for Help in Promoting Public Good Will and Attendance, in Reducing the Federal Admission Tax, and Improving General Efficiency of all Operation.

and the Sheriff of Hennepin County, Ed Ryan; and were addressed by a Methodist minister, a Catholic priest and a Jewish rabbi.

They were entertained by committees of Minneapolis IA locals under chairmanship of Fred W. Berglund; and by courtesy of local theater owners their IA "delegate" or "guest" badges were open sesame to every theatre in Minneapolis and St. Paul.

Highlights from Pres. Walsh's Report

Some of the highlights of the report President Richard F. Walsh presented to the Convention included these remarks:

"Through cautious precedures, we have been able to avoid most of the ravages threatened by the Taft-Hartley law and similar measures on the state and local levels. But we must never be lulled to sleep by our success thus far in this respect. If there should be a clear-cut reactionary majority in Congress—and an administration which goes along with it—then, I am convinced, the unions would really begin to suffer. To help avoid such a calamity, I have continued wholeheartedly to advance the program of Labor's League for Political Education.

"Whenever organized labor endorses a candidate, his election hinges to a substantial degree, upon how organized labor is regarded. . . . The esteem in which labor is held by the voting public as a whole will have a tremendous bearing on labor's future.

"I want to express my gratitude to those locals and individuals who are doing so much for the good name of the International Alliance. . . . Your response to the Will Rogers Memorial Hospital drive, and to numerous other causes, has been overwhelming. The list of members heading community drives and serving in a wide range of community posts has increased . . . several pioneering locals have stepped forth as sponsors of Boy Scout troops. Little League baseball teams and similar worthy projects.

"All told, we now have 982 local unions, a new record, and the total membership of the Alliance is higher than ever before in history.

"In the war years, the employer got in such a rut that no matter what you gave the public, they would buy, and they did buy. No matter what kind of a theatre they would have to come in and look at it, no matter what kind of projection equipment you gave them, the public

Temporary chairman, Congressman Roy Wier of Minneapolis and former president of Local 13, hands gavel to IA President Richard F. Walsh.

would have to buy. The employer is waking up to a clean and painted theatre, good seats, and projection equipment of the best. With that thinking and our thinking, I am sure that we can cope with the threat of television or any other threat."

United States Senator Hubert Humphrey (D.–Minn.) delivered the principal address of the first day of the convention, speaking for approximately an hour. George Grim, war correspondent and columnist of the Minneapolis *Tribune*, explained the paradox of the fighting in Korea; the delegates heard and applauded a detailed account of the IA's successful struggle against attempted Communist penetration of Hollywood personnel; they listened to James L. McDevitt, National Director of Labor's League for Political Education, and to Rev. Father F. J. Gilligan on the topic: "A Student Looks at Labor."

Highlights from Exhibitor Remarks

Eric Johnston, President of the Motion Picture Association of America, told the delegates that since 1946 the American people have increased their expenditures for personal consumption by 40 per cent, but the percentage take of the motion picture industry has not increased at all but actually declined, and this trend must be reversed. "I am not suggesting that you lower your wages or increase your hours for the same pay," he pointed out. He asked cooperation in two forms: first, to eliminate all unnecessary costs—"be as efficient as we can be." And, second, cooperation in the industry's drive to eliminate the 20 per cent Federal admission tax. "Last year, the motion picture theatre spent seven times as much in taxes as the profit was. No industry can go that way for long, and I am delighted to learn from your President that your organization is going on record to join COMPO's very fruitful drive. . . ."

Col. H. A. Cole, Director of Allied States Association of Motion Picture Exhibitors, noted that costs of theatre operation have mounted—that admission cannot be increased to match because higher admission prices keep the public away and actually reduce the total take. Meanwhile, the theatre's employes are faced with rising costs of living and "where is the money going to come from?" Col. Cole also pointed to the wear and tear on theatre equipment and the need for setting aside a reserve to replace it—"we count on perhaps ten years for the life of a projector"—as well as to the probable need for buying theatre television equipment in the future; and asserted that the theatre cannot at present afford to set aside a reserve for replacements and innovations. "So, five or ten years from now, our house is valueless. It may still be there in some kind of form, but not in the form that will attract customers." He appealed to the IA to help the theatre industry by seeking removal of the Federal tax. President Walsh promised him cooperation along that line.

Major Leslie E. Thompson, RKO executive, requested similar tax cooperation, and, in addition, a "booster campaign." He thought organized labor could do more to promote picture attendance than almost any other element in the business. Labor, he declared, has the same stake in the motion picture industry as the people on the management side. He reminded the convention that, whereas a theatre employs an usher, a projectionist, and perhaps a stage hand, the television set in the living room employs nobody.

Charles W. Perrine, Vice President of Minnesota Amusement Company, owner of 60 theatres, also asked cooperation in promoting picture attendance—"make it part of your job, even though it is not part of your pay"—and in tax repeal. In the latter connection, he suggested that Federal tax action might not in itself be

(*Continued on page* 26)

Outstanding Acts of the Convention

1. Re-elected President Richard F. Walsh and his "official family." Owing to the death of William P. Covert, former second vice president, the five vice presidents from third to eight were voted forward one step each and Hugh J. Sedgwick, Ontario, Canada, was elected to be eighth vp.

2. Urged Congress meet at the earliest possible moment to appropriate funds for low-cost housing.

3. Referred to the General Office a resolution opposing safety film.

4. Referred to the International President a proposed 25 per cent increase for traveling members. (President Walsh explained to the Convention that it would be unwise and short-sighted to open existing contracts for this purpose.)

5. Called on Congress to refrain from further weakening price controls but on the contrary to strengthen some of them.

6. Voted support "by every means possible within the law" of political candidates opposed to the Taft-Hartley Act, and "every assistance" to Labor's League for Political Education.

7. Endorsed FEPC "in accordance with the position of the AF of L"; endorsed $1.00 minimum wage, expanded social security coverage with reduction of retirement age to 60 years, heavier excess profits taxes and lower taxes for incomes under $5,000.

8. Resolved that each Local Union urge its members to visit their respective Congressional candidates in the interest of elimination of the 20 per cent Federal admissions tax; and appeal again in the same cause to their elected Congressmen when the new Congress convenes.

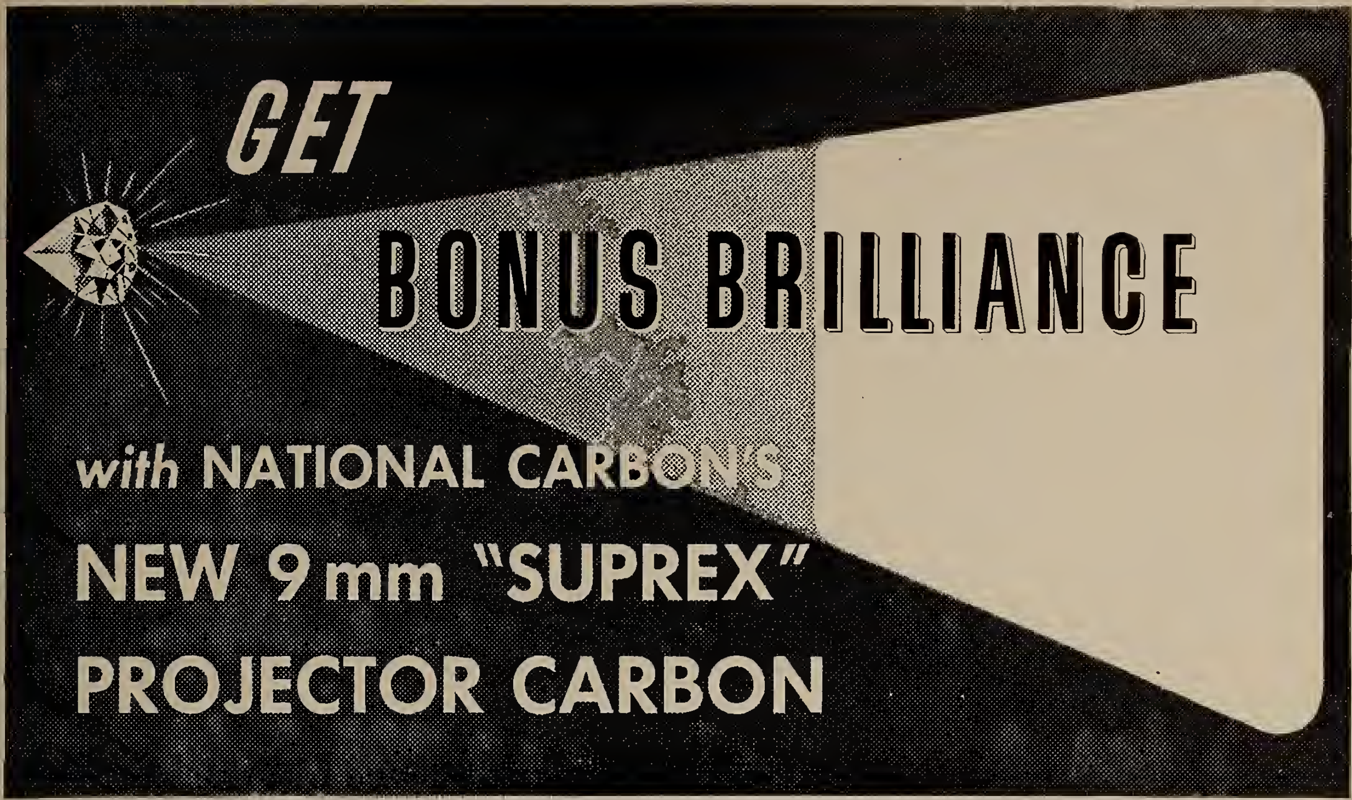
9. Suggested to the International President and Executive Board that they formulate and recommend a policy to meet the new problems involving wages, manpower and jurisdiction in the television field.

10. Voted formation of a committee to formulate plans for industry-wide pensions.

11. Expressed appreciation and commendation to Dr. Lee de Forest as "a chief contributor to the scientific developments which have made motion pictures so important a medium."

12. Referred to the General Office for action a resolution strongly opposing the new anti-trust suit which is intended to compel producers to release motion pictures for television showings.

13. Favored decontrol of wages in industries where prices are not controlled.



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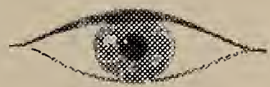

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Heart of the Projector Mechanism

THE HONOR of borrowing the Swiss geneva movement for movie-projector intermittents probably goes to C. F. Jenkins and Thomas Armat, American movie pioneers. But the geneva movement in their first projector (not the Vitascope of Music Hall fame) bore slight resemblance to a modern geneva intermittent. Completed on the 28th of August 1895, the Jenkins-Armat projector had a 14-slot star-wheel and a sprocket having 56 teeth per side. The drive was a cam with a geartooth-like pin. Edison's Kinetograph of 1891 was the first *camera* with this intermittent.

The Edison Kinetoscope of 1893 (the peep-hole viewing machine, not the projector brought out in 1897) made use of the same type of movement.

Early Model Projectors

Now, the very first practical movie projector (which was also a camera) was the Lumiere Cinematographe, used successfully in 1895. But this utilized a claw movement, not a geneva intermittent. The not-too-successful Latham Pantoptikon projector of 1895 used a striker movement, *as did Thomas Armat's second projector, the Vitascope.*

Amat's Vitascope more than vitalized the audience at Koster & Bial's Music Hall, New York, the night of the 23rd of April 1896. Billed as "Thomas A. Edison's latest marvel" to capitalize on the magic of Edison's name, it projected a short one-reeler titled "The Sea Waves." Patrons went wild, holding up the remaining acts of the variety program until the movie was shown over again.

Meantime, Robert W. Paul was fiddling with the flickers in London. A protagonist of the geneva movement, he reduced the number of slots in the star-wheel from 14 to 7. But because he used two star-wheels and intermittent sprockets in his Theatrograph, the set being driven by one double-pinned cam-wheel, Paul still had a sum-total of 14 star-wheel slots in his projector.

In 1897, we find the familiar 4-slotted star-wheel in *three* projectors using the geneva intermittent. These projectors are:

An improved Paul projector.

A third Armat projector.

The Edison Kinetoscope (this time a projector, not the peep-hole machine).

Let the reader decide which of these three picture machines was first. We don't know.

In 1898 the first *practical* motion-picture projector using the conventional 3:1 geneva intermittent appeared on the

Part II

By ROBERT A. MITCHELL

market. This was the Optigraph, the first projector made by Motiograph. The Optigraph was designed by Alvah C. Roebuck, founder of Motiograph (then known as the Enterprise Optical Mfg. Co.).

About the time that the loosely organized American motion picture industry was becoming centered in the Los Angeles area—the first Hollywood production was a Nester Co. western made in 1911—there were scores of different makes and models of projection machines on the market. The nickelodeon was a booming business; the plush palaces of the photoplay were already in sight.

It was during the first fifteen years of the present century that three remarkably satisfactory projectors made their appearance. These were the Motiograph 1A, the Simplex Regular, and the Power's.

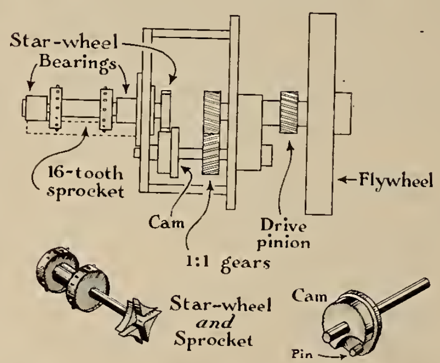

FIG. 4. Geneva movement, assembled in its oil-well case, and with its star-wheel and cam shown separately. The design here pictured is the one in which the flywheel, instead of being mounted directly on the cam-shaft, is geared to it through two small 1:1 gears, and thus lined up with the intermittent-sprocket-star-wheel shaft.

The Motiograph 1A was a direct development of the Optigraph. The Power's was an original creation from the outset; but the Simplex was a development of the Edengraph, a projector originated in 1899 by F. B. Cannock, a projectionist at the Eden Musee, New York City. Cannock later improved this machine with the aid of E. S. Porter. The Simplex made its commercial appearance in 1911.

The writer does not know whether there are Motiograph 1A's still in theatre use somewhere in the world; but it is common knowledge that Simplex Regulars modernized with rear shutters, better gears, better sprocket idlers, slip-in aperture gate assemblies, double-bearing intermittents, etc., hold sway even now in some projection rooms. And the last Power's model, though not common by any means, can still be found in the "picture halls" of back-woods hamlets.

The 4-slotted star must always be used in a 3:1 movement because if the cam-wheel were made larger in order to give a quicker pulldown, the cam-pin would not enter the slots tangentially, but would strike the sides of the slots at the moment of contact, resulting in noisy operation, rapid wear, and damage to the film.

Geneva Movement Details

In a 3:1 geneva movement, acceleration is very slow at the beginning of the pulldown. The speed is greatest at the middle of the pulldown (film-speed being 860 feet per minute for an instant). Thereafter, the star and sprocket slow down gradually until they come to the reset position. Now if it were not for this *gradual* deceleration, the film would have a much greater tendency to overshoot, continuing to move down through the gate on account of its own momentum *after the sprocket had stopped turning.* A terrific amount of pad tension would be required to stop the film instantly—and you can well imagine what the sprocket-holes would look like in *that* case.

All of these facts must be kept in mind when attempting to evaluate the worth of any type of intermittent.

Figure 4, while not reproducing exactly all the details of any specific make of geneva intermittent, shows how the parts are put together and geared in the Simplex Regular, the Super Simplex, the Simplex E-7 (but not the X-L), the Brenkert, Century, Wenzel, DeVry, and movements made by La Vezzi. The same movement is interchangeable in many of these machines without drive-gear alterations. (DeVry uses chain drive.)

Note especially that the gears marked "1:1" enable the constant-speed drive pinion and flywheel shaft to lie on the same axis as the star-wheel and intermittent-sprocket shaft. Thus the entire movement can be rotated around this axis without interfering with the mesh between the drive-pinion and the gear which drives it (not shown).

Motiograph projectors and the Simplex X-L dispense with the "1:1" internal gearing by attaching the flywheel directly to the cam shaft. The Simplex X-L rotates the sprocket to frame; but

framing in the Motiograph is accomplished by moving the unit vertically.

There are arguments *pro* and *con* these methods of framing. Brenkert, for instance, is of the opinion that rotary framing is better because, when the sprocket maintains the same distance from the gate at all times, it is unnecessary to have an intermittent-sprocket shoe independent of the gate-door—requiring one extra operation in threading —and also because it is believed that sprocket-tooth wear is more even with rotary framing.

Intermittent Bearings and Cam-pins

In single-bearing intermittents there is only one bearing for the sprocket and star-wheel shaft. This bearing, naturally, is between sprocket and star. If an extra bearing be added on the outboard side of the sprocket, the movement is designated as a double-bearing movement. Single-bearing intermittents of the old Simplex-Regular type are no longer made. The International Projector Corporation (Simplex) gave them up in 1933 and discontinued factory repair service on them in 1939. But the Simplex double-bearing movement fits the old Regular and the newer Super without alterations in the mechanism. The two are interchangeable. Incidentally, other companies supply these standard intermittents—La Vezzi and Century, for example.

It was found that when old-style single-bearing intermittents became only slightly worn, a vibration of the picture, looking like hazy focus, is likely to occur. At first this haze can be seen only from the front rows; but it gradually extends to the rear of the auditorium.

Motiograph also uses a doublebearing intermittent; and it has the advantage of a construction which enables the sprocket to be reversed or replaced without the necessity of removing the intermittent unit from the head. Brenkert, however, has retained the simplicity of the original single-bearing intermittent while overcoming its defects by means of a very long bronze bearing.

In other makes of projectors, the intermittent movement is one of the very few units where hard steel is permitted to run against hard steel; but Brenkert is able to make use of bronze bearings. which can be machined with astonishing accuracy, because of the Brenkert lubrication system which insures a continuous flow of oil over all parts of the intermittent. If the oil were confined in a small intermittent case, the heat generated and confined therein would result in uneven expansion between the bronze bushings and the steel shafts, which might result in rapid wear and even bind-ups. The Brenkert models, by the way, follow widespread European practice in the large size of the star and cam.

We are informed by a European correspondent that all the "better" projectors there have *roller* cam-pins. Stationary pins are said by the same highly respected source to be confined to *Negermaschinen* (low-priced projectors for export only). Now the American Brenkert projectors actually *do* have the roller cam-pins so greatly desired in Europe! But other top-quality projectors have non-revolving cam-pins of hardened steel.

As far as this writer's experience goes, he has yet to see a case where the stationary, or non-revolving, cam-pin has in any way impaired the quality of the geneva movement or its performance. (The same, however, is not true of the Power's movement.)

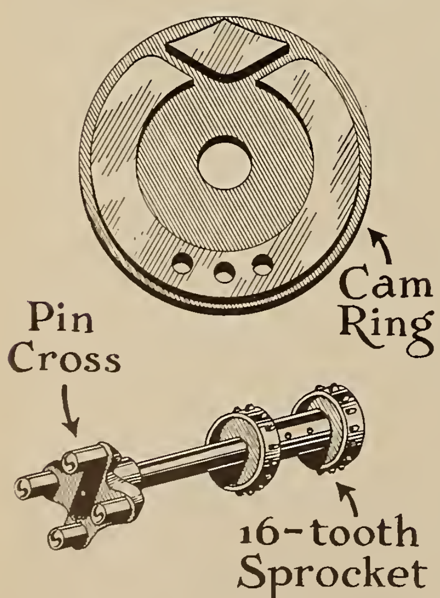

FIG. 5. The Power's pin-cross intermittent movement. The diamond portion of the cam-ring imparts a quarter-turn to the pin-cross, after which the roller pins are again engaged and locked in "at rest" position by the circular portion of the cam-ring. The three small holes in the cam-ring have nothing to do with the action but are the means by which the ring is statically and dynamically balanced.

Power's Projector

The unique and interesting thing about the Power's mechanism is the pin-cross intermittent. It worked silently and very rapidly, at approximately the very desirable 5:1 ratio. The famous Power's No. 6 (solid-pin) projector appeared in 1909. The 6B, utilizing roller pins, was made in 1920. Many projectionists had hoped that the highly efficient Power's pin-cross intermittent would be adapted to the Simplex when, in 1925, plans for the Power's No. 7 went out the window and Simplex and the Nicholas Power Co. were consolidated into the International Projector Corp.

From the projectionist's point of view, the overall design of the Power's is rather primitive. The dust-catching open construction of the head, the gearing of the intermittent through a toggle drive to permit the framing carriage to be moved up and down without affecting shutter timing, the very small film-gate. the gate-door which swings on hinges. the arrangement of flywheel, sprockets, idlers. etc., seem more than a little Victorian. On the credit side may be entered the simplicity of the Power's mechanism, the ease of servicing, and the extreme quietness of operation when all gears, bearings, and sprockets were in good condition.

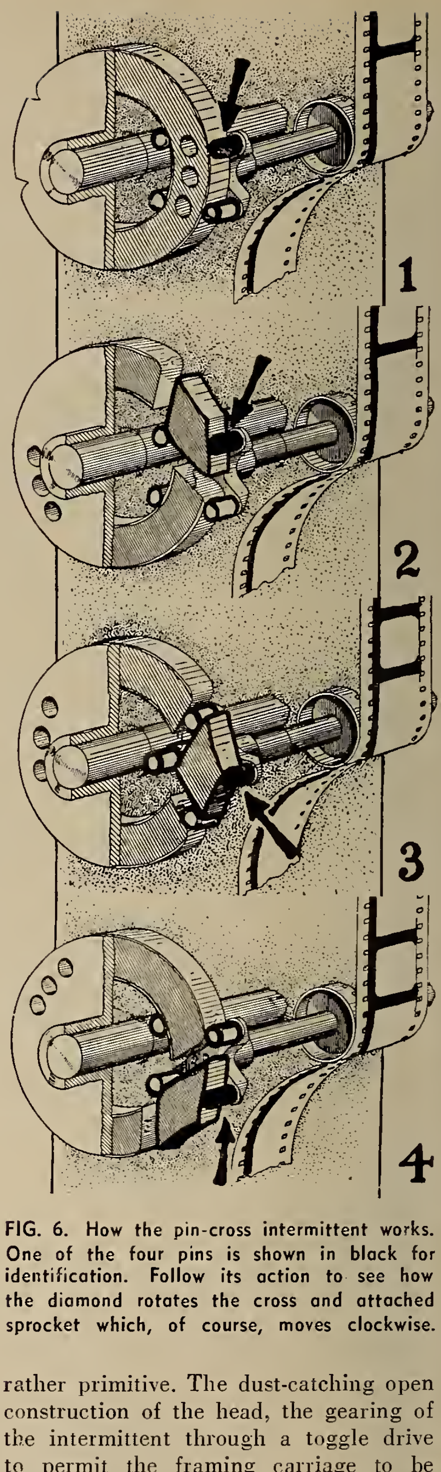

FIG. 6. How the pin-cross intermittent works. One of the four pins is shown in black for identification. Follow its action to see how the diamond rotates the cross and attached sprocket which, of course, moves clockwise.

The quietness of the Power's never fails to astonish projectionists who have not previously operated it. Despite the

(*Continued on page* 30)

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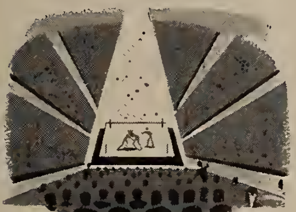

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Parallax Barriers in Stereoscopy and Tv†

Parallax barriers are basic to certain systems of three-dimensional projection which do not require the audience to wear spectacles of any kind; and also form the basis of certain full-color television picture tubes. An outline of the optical properties of these barriers as used in both devices is here presented.

By SAM H. KAPLAN
Engineering Consultant, Chicago, Ill.

A PARALLAX BARRIER may be defined as a masking device which, when interposed between an object space and an image space, prevents any part of the image space from being sighted except along a given set of predetermined directions.

The concept of the parallax barrier is generally attributed to Berthier of France who suggested it in 1896. However it was first applied by Frederick E. Ives to produce stereoscopic still pictures in 1904. These were called "parallax stereograms" and required no separate viewing accessories. The substitution of lenses as an alternate to mechanical blocking barriers was proposed by Gabriel Lippman of France in 1908.

A barrier system with more than two elements behind each barrier aperture was invented by C. W. Kanolt, who obtained U. S. Patent 1,260,682 on March 26, 1918. His stereoscopic pictures were called "parallax panoramagrams" and revealed a multitude of stereoscopic views as the picture was viewed from different angles. A radial nonparallel-type barrier system was invented by B. T. Ivanof who first used it in 1941 to show projected stereoscopic motion pictures in Russia.

Since both light and electron beams travel along straight paths, the laws of geometric optics apply irrespective of direction of travel along this path. Consequently, parallax barriers can be utilized either where a viewing screen is observed from predetermined directions as in stereoscopic imagery, or where a luminescent screen is impinged upon by electron beams coming from specified directions, as in color television tubes. Parallax barriers are now being used for both of these very different purposes.

The use of parallax barriers as external attachments to cathode-ray tubes for stereoscopic television is included in several patents. The use of such parallax barriers *inside* a cathode-ray tube, as a positive means of insuring that predetermined portions of a mosaic screen would be subjected to bombardment only by a predetermined electron beam, was first revealed in German Patent 736,575, issued June 22, 1943. The application date is July 12, 1938, and the inventor was Dr. Warner Fleshig of Fernseh A.G.

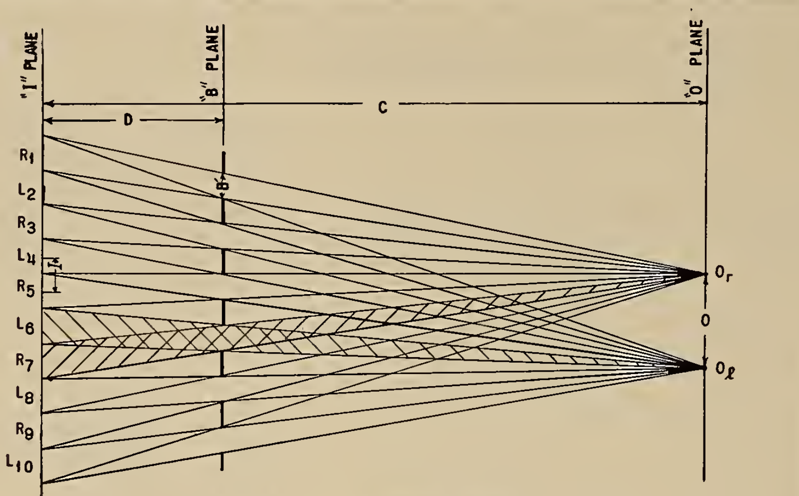

FIGURE 1. Two-element barrier.

Application of the parallax barrier to stereoscopic pictures is illustrated in principle in Figure 1.

Two pictures taken from slightly separated points of view and designated as left and right views, are divided into fine strips and reassembled on an alternate basis: R_1, L_2, R_3, L_4, R_5, etc., (the odd numbered L strips and the even numbered R strips are not used).

The picture thus assembled is located at the "I" (image) plane of Figure 1. In front of it, at the "B" or barrier plane, is located a barrier composed of alternate opaque and transparent strips of equal width. On the "O" or object plane, Figure 1 shows the viewer's right and left eyes, designated O_r and O_l, respectively. If the barrier is properly located between the eyes and image, the viewer's *left* eye will see only the L strips of the image, the R strips being hidden from it by the barriers; and similarly the viewer's right eye will see only the R and not the L strips and barriers. If the strips are of such small width that they are not individually resolved by the eyes a stereoscopic picture results, since each eye sees a slightly different image.

From simple geometrical considerations it is possible to determine that the relationship between image distance (D), distance between image strip centers (I), separation of eyes (O), and distance of eye plane to image plane (C), is:

$$D = \frac{IC}{O + I}$$

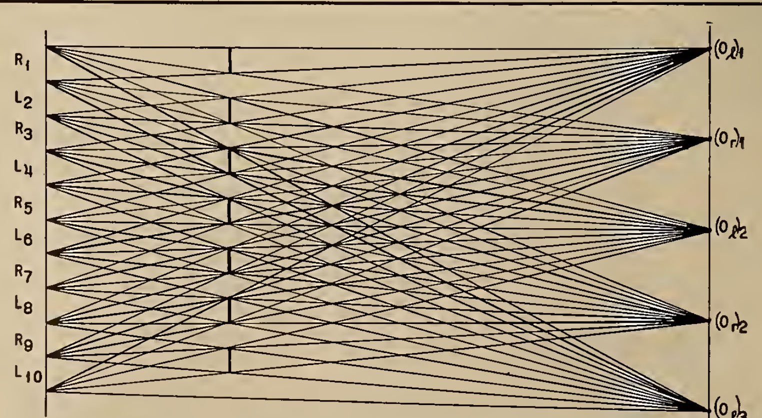

FIGURE 2. Two-element barrier showing repeating "O" points.

† Cond. from Jour. SMPTE, July 1952.

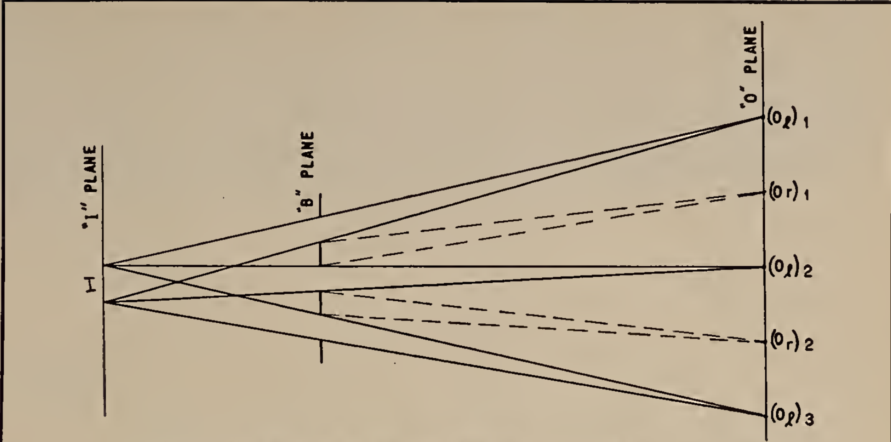

FIGURE 3. Alternate viewing of same element by different "O" points.

Although the distance between the eyes (labeled as "O" points), and the image, increases steadily in going from the center to the edges of the image, the band width of the picture strips and barrier strips is constant, and is independent of the angle between any image portion and line of viewing. The width (B′) separating the barrier strips can be determined from similar triangles as:

$$B' = \left(\frac{C - C}{C}\right) 1$$

In Figure 1 the distance B between barrier strip centers is 2B′.

The question next arises whether there are other points in addition to O_l and O_r from which the same picture (i.e., left image seen by left eye and right image seen by right eye) can be viewed. As shown in Figure 2, by projecting rays from the image through the apertures between barriers, using in turn different barrier spaces for a given image strip, one can obtain an alternating sequence of equally spaced O_l and O_r points.

Any combination of O_l and O_r points, whether adjacent or nonadjacent, will fulfill the condition that one "O" point "sees" only one image set and the second "O" point sees the alternate image set. Figure 3 shows in more detail the relationship between these different "O" points and a given image strip. The only difference is that a particular strip (in this case L_1) is "seen" by $(O_l)_1$ by $(O_r)_2$, and by $(O_l)_3$ through different barrier plane apertures—as by persons sitting side by side in a theater.

Radial Theater Arrangement

If the image, barrier and source surfaces are planar, they need not be parallel. One such arrangement of interest is the radial plane arrangement, invented by Ivanof and used for stereoscopic pictures. A shown in Figure 4, all three planes meet in a common line of intersection. For motion pictures the "I" plane corresponds to the screen, the "B" plane is the parallax barrier and the "O" plane the audience. This arrangement permits a large number of seats to satisfy the parallax condition, in contrast to the parallel plane arrangement (Figure 2) where only one row in the theater could meet the necessary condition. (Of course, if the rows of seats in a theater could be stacked vertically instead of horizontally then the parallel plane arrangement of Figure 2 would be suitable to theaters.)

One defect in the practical application of parallax barriers is the transmission loss introduced by the barrier itself. This limitation can be minimized by replacing each aperture or slit by a spherical or a cylindrical lens, as shown in Figure 5. Replacing the aperture by a larger size lens can theoretically cut the barrier loss to zero. Instead of acting as a mechanical barrier, the lenses refract or converge the rays to the proper position on the image surface. In stereoscopic picture processes modern practice sometimes calls for cylindrical lens elements molded into the film base.

Instead of two viewing points (called "O" points) coupled to two mutually intermeshed image area sets, three or more intermeshed image area sets can be coupled to a corresponding number of viewing points. And while the "O" plane has been considered thus far as a viewing plane, the various "O" points in that plane may also be considered as origins of electrons—as in a Tv picture tube.

Color Tv Application

If one deals with electron rays instead of light, electron lenses can be used, and the apertures themselves can act as the electron lenses. Owing to the focusing action, these apertures, serving as electron lenses, can be larger, thus increasing the number of electrons reaching the image plane. To make the apertures behave as electron lenses, it is only necessary to provide for an electric field between I and B (Figure 1) greater than that between B and O.

The parallax barrier is particularly suitable as an internal member in cathode-ray tubes, permitting positive screen area control and ensuring that a given beam will impinge only on a given portion of the fluorescent screen.

Specified screen areas are associated with a desired source of electrons, and electrons from other sources are blocked from the same area by the barrier. The

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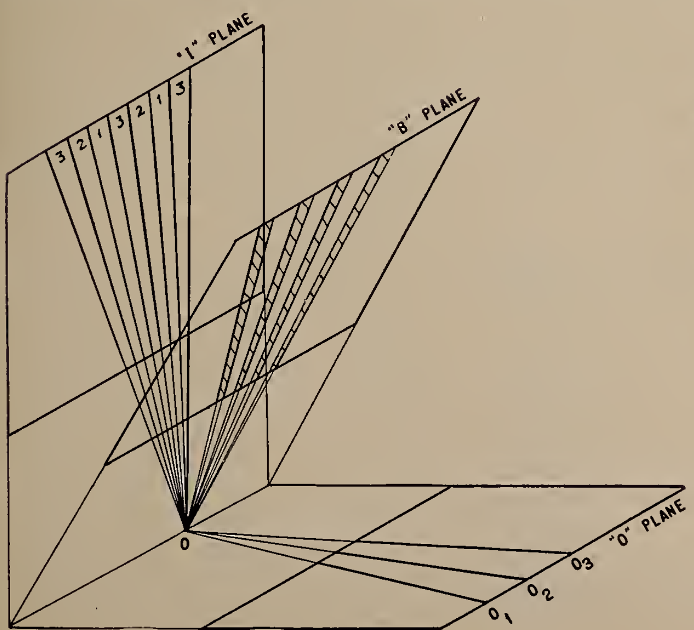
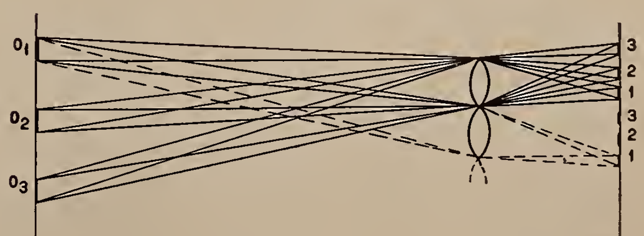


FIGURE 4 (left). Radial barrier extends system of Figure 2 to many rows of seats.

FIGURE 5 (below). Lens equivalent of barrier.

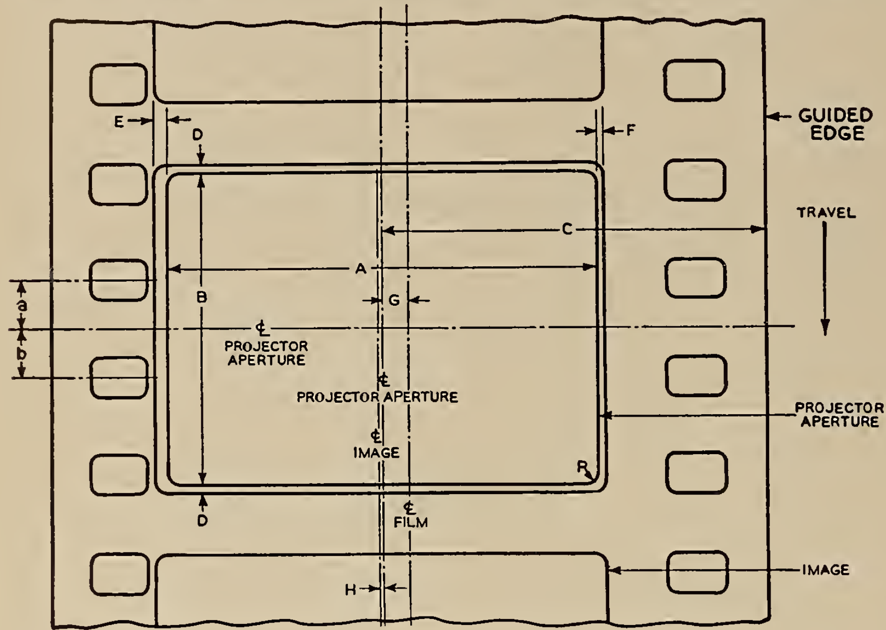


Standards Promote Better Projection

III

IP herewith concludes for the present its presentation of those established *35-mm* projection standards that are of especial interest to projectionists. As new standards are adopted in the future, IP will report them. Standards for *16-mm* projection are presented elsewhere in this issue.

Projection Aperture of 35-mm Sound Projectors (Z22.58-1947)



These dimensions and locations are shown relative to unshrunk raw stock.

Dimension	Inches	Millimeters
A	0.825 ± 0.002	20.95 ± 0.05
B	0.600 ± 0.002	15.25 ± 0.05
C	0.738 ± 0.002	18.74 ± 0.05
D	0.0155	0.394
E	0.028	0.71
F	0.015	0.38
G	0.049	1.24
H	0.006	0.15
R	0.05 approx	1.3 approx

a = b = ½ longitudinal perforation pitch.

The aperture dimensions given result in a screen picture having a height-to-width ratio of 3 to 4 when the projection angle is 14 degrees.

Buzz-Track Test Film for 35-mm Sound Reproducers (Z22.68-1949)

1. Scope and Purpose

1.1 This specification describes a film which may be used for checking the lateral scanning slit placement of 35-millimeter motion picture sound reproducers.

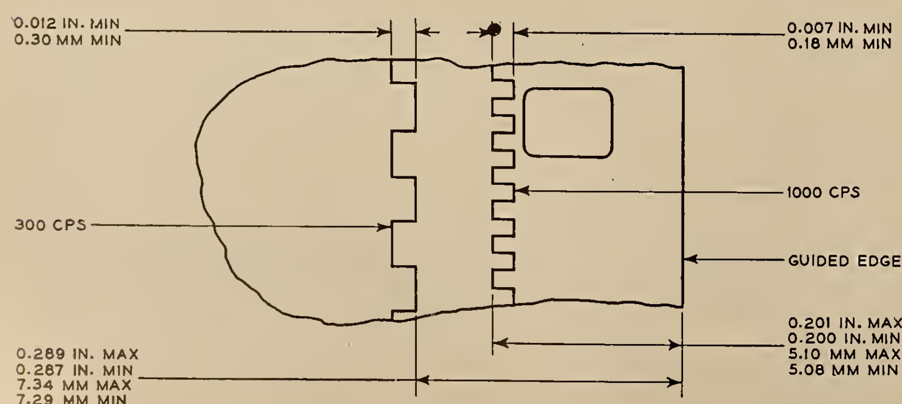
2. Test Film

2.1 The test film shall be a direct positive recording or a print from an originally-recorded negative and shall contain 300-cycle and 1000-cycle square-wave tracks on either side of the central exposed strip as shown in Fig. 1.

2.2 The central exposed strip and the exposed portion of the two signal tracks shall have a minimum density of 1.4 and a maximum density of 2.0.

2.3 The film stock used shall be cut and perforated in accordance with the American Standard Cutting and Perforating Dimensions for 35-Millimeter Motion Picture Positive Raw Stock, Z22.36-1947, or the latest revision thereof approved by the American Standards Association, Incorporated.

2.4 The film stock used shall have a shrinkage of not more than 0.50 percent.



New NCC Projector Carbon

The constant search for more light on the screen, higher current efficiency, lower carbon consumption and greater burning stability has again been further advanced. National Carbon Company announces a new 9-mm & 14 in. "Suprex" positive, incorporating a new composition of materials. These novel materials result in performance characteristics previously unattainable, NCC reports.

The new "National" carbon is intended for use in mirror-type lamps in medium and large theatres. It is rated at 65-75 amperes in contrast with the former 9-mm "Suprex" rating of 75-85; its voltage requirements are also lower, being approximately 41 volts at 65 amperes; 45 volts at 75 amperes.

Either of two advantages may be realized. The user can obtain more screen light with the same carbon consumption; or the same light as before with lower carbon consumption, cooler lamp, improved arc stability, and decreased current and maintenance costs. Further, the new carbon will operate well outside its rated current range, performing satisfactorily down to 60 amperes and with reasonable performance safety factor above 75 amperes, it is stated.

A variety of trims is possible. For example, the new 9-mm positive can be substituted, not only for the former 9-mm positive, but also for the present 8-mm "Suprex." In this latter substitution, NCC says, it will give equal light with better distribution at the same current (up to 70 amperes) cost, and lower carbon consumption cost. In such operation the new carbon is burned with an 8-mm "Orotip" C negative.

Stability of operation and uniform light intensity are maintained with all types of power sources, National Carbon declares.

The new carbon was released only after extensive working tests in theatres repeatedly and abundantly verified the highly favorable findings of the laboratories.

Lawrence Theatres Buy RCA Service

RCA Service Co. will supply maintenance and sound replacement parts to the eight theaters of Joseph L. Lawrence circuit under terms of a contract recently concluded.

Budget Pains Turn Tv to Projection

INCREASING use of projectionists and projecton techniques in Tv studios is the current result of sponsor pressure for better shows at lower cost. What the sponsors want can't be achieved by the expensive method of building and tearing down sets—they want a $10,000 Tv production to look like a million-dollar motion picture!

Budgets are tight—but even if they were not a $10,000 appropriation can't be ballooned that far. Actually, however, budgets are extremely tight. The sponsor does not conceive of himself as competing against Hollywood lavishness; he views his Tv program in the light of the cost of comparable newspaper, magazine, or radio advertising. But the audiences—now that the novelty is wearing off—expect something at least remotely like what they have been accustomed to seeing in their local theatres; and the sponsor must give them what they want or they may stop looking at their Tv sets and go to the movies!

The projectionist and his skill with films and slides, plus one or two new projection devices developed specifically for Tv, have thus presented at least a partial and temporarily satisfactory solution to the problem of making ten thousand dollars look like a million.

Rear projection of 16-mm and 35-mm films (the trend is now toward 35-mm) plus rear projection of slides, rear projection of "effects" of the kind used in thousands of theatres in the 1920's and still used in some, and plus special new effects provide the Tv players with backdrops that look like the real thing—and offer skilled projectionists added opportunities for part- or full-time employment.

Wide angle lenses, having a spread of 12 inches width for each 9 inches of throw, are in general use for such rear projection. Screens are plastic, transmitting about 50 per cent of the light, and range from 9' x 12' up to 12' x 24'. Projectors use arc lamps of from 90 down to 35 amperes, or incandescent lamps from 5KW down to 2KW. On wide screens as many as four projectors may be operated with images carefully "feathered into" one another to maintain continuity and equality of brilliance.

Simple slides are more-or-less standard 4" x 5" units, commonly consisting of a developed emulsion on a single piece of heat-resisting glass. Libraries of such slides, available on a rental basis, have been built up in a number of key cities. With airblast cooling a slide can be projected continuously for half an hour or more, and suffer no damage.

"Effect" slides, formerly widely used to provide a frameword for the title of a feature picture, and still used in some theatres for that purpose, provide today's Tv with moving backgrounds not otherwise attainable at any comparably low cost. Moving clouds, ripples, flames, snowstorms and the like can readily be created in this way. Effects can be interleaved by means of revolving discs mounted on another projector.

A piece of special equipment finding rising favor—and one that should also prove useful in producing special "effects" in theatres—is the Panoramic Slide. This device utilizes strips measuring 4" high and from 20" to 72" long. The long slide is automatically moved through the aperture at any desired speed, permitting the actors to appear to be walking or riding along while actually remaining in one place. The enormous saving in cost achieved by such a slide strip in contrast to the cost of using built-up background scenery moving on a treadmill, needs no emphasis.

Motion picture rear projection, in addition to slide rear projection, is growing in importance. Originally, Tv studios were seldom built with local code and Underwriters' projection requirements in mind, and therefore 16-mm projectors equipped with 35-mm lamps were at first preferred. However, the amount of light that can be pushed through a 16-mm aperture is somewhat limited. It is adequate when all that is wanted is a background representing the interior of an automobile or railroad coach, but when, for example, a boat scene or hayride are called for, no one is too happy with the 16-mm results. Therefore the rear-projection Tv tide is now swinging toward 35-mm, where limitations are more generous.

With these new tools at hand and with a well-thought-out combination of built scenery and rear projection, a skilled and ingenious projectionist can quite inexpensively put the Tv actors in a moving train, boat, or automobile, or strolling down a Paris boulevard.

Rear projection with slides and film is a growing field in Tv, having pretty much unlimited horizons for new developments and resourceful projectionists. It still will not make $10,000 look like a million dollars; but the sponsor may be content if it makes 10 look like 20. Meanwhile, the theatre, of course, will be improving its own techniques, and may very well in time borrow from the Tv studios, and from Tv projectionists a trick or two to enhance its own audience appeal.

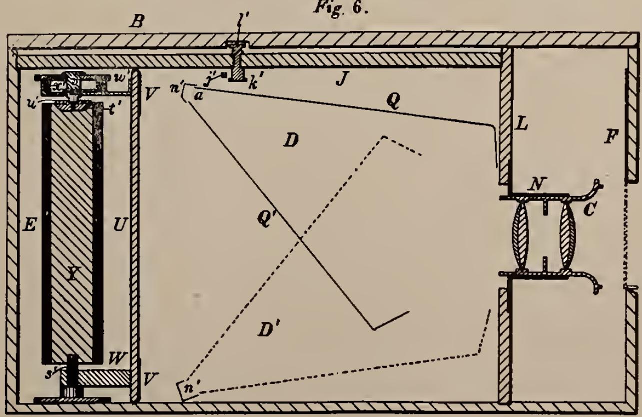
(No Model.) 4 Sheets—Sheet 3

G. EASTMAN & F M. COSSITT

DETECTIVE CAMERA

No. 353,545. Patented Nov. 30, 1886.

Fig. 6.



Pivoted drop shutter of Eastman's first camera in cross section. When button I' on top of camera is turned, shutter QQ' drops from D to D'; after exposure is returned to D by a knob on side of the camera, not shown in drawing.

IN THE

SPOTLIGHT

AN AMENDMENT introduced by Rep. Paul C. Jones (D.-Mo.) and adopted by the House specifically calls for the exemption of wage controls in motion picture theatres, film studios, and radio and television stations. Price controls in these industries are already exempt and the loose wording of the original bill led one to believe that the exemption did not extend to the control of wages.

• "Unfair employment practices," is the charge leveled against the management of the Pineville Road Drive-In Theatre by IA Local 322, Charlotte, N. C. We are advised that members of the Local are picketing the theatre every evening until closing.

• In an effort to help stimulate attendance at motion picture theatres, Local 735, Mt. Clemens, Mich., has agreed to help the exhibitors in the Local's jurisdiction in the "Take Her Out Once a Week" campaign. Bert Penzien, Fritz Devantier, Roy Suckling and Ralph Brough were appointed by the Local to serve on a committee to promote this campaign in neighboring small towns.

• The temporary injunction granted to A. L. Royal, secretary-treasurer of the Mississippi Theatre Owners Ass'n and head of a chain of theatres in that state, against Local 616, Meridian, Mass., was withdrawn by mutual agreement, upon the signing of a new contract covering two of the theatres in dispute.

• Michael J. Mungovan, business representative of Rochester Local 25, was re-elected 4th vice-president of the New York State Federation of Labor at the recent Federation Convention. Mungovan was also chosen to represent the Rochester Central Trades and Labor Council at the forthcoming AF of L Convention scheduled to be held in New York City the week of September 15.

• Projectionist Local 219, Minneapolis, Minn., recently concluded negotiations with the independent theatre owners and signed new three-year contracts calling for a wage increase of 3% for each of the first two years, and an additional 4% hike the third year, retroactive to December 1, 1951.

• The members of Local 294, Phoenix, Ariz., are very proud of their organization and rightly so, we believe. Although the membership of the Local is relatively small—only 43 men—it recently presented a check for $500 to the building fund of the Samuel Gompers Memorial Crippled Children's Clinic. The clinic is being built by the various AF of L unions and is financed by contributions from individual members.

Nugget Cornell, business representative of Local 294, in turning the check over to the clinic fund, stated that his members were very happy to take part in such a worthy project, for not only do the crippled children need all the help they can get but he also stressed the importance of labor unions taking an important part in all community and civic affairs.

• Veteran projectionist, Cecil Wood, member of New York Local 306, Miami Local 316, and past president of the 25-30 Club, will resign October first next from his job as projectionist at the New York Paris Theatre and retire to Miami to live. Wood, who is 79 years old, started his career as a projectionist back in 1899 with the Jeffries-Sharkey fight films and has worked continuously at the craft since that time—a total of 53 years. He deserves a rest!

• A fatal heart attack ended the career of William F. Hall, 45, charter member of Local 451, New Castle, Penna. Hall had been employed for the last few years as projectionist at the Vogue Theatre.

• The Motion Picture Screen Cartoonists Local No. 839, Hollywood, Calif., is the latest addition to the IA family. M-G-M's Bill Schipek was elected the Local's first president.

• At the June 27 election held by Hollywood Film Enterprises, Inc., of Hollywood, Calif., laboratory technicians, their apprentices, and helpers voted 12 to 4 in favor of IA representation. The vote was certified on July 9 last.

• Alonzo S. Bennett, secretary-treasurer of Local 521, Long Beach, Calif., tells IP he is getting remarkably fine results from the Huff carbon coolers recently installed in the Rivoli Theatre, Long Beach, where he is chief projectionist. More light, less amperage, less carbon consumption, less pitting of mirrors, cleaner lamps, and the practicability of changing carbons with bare fingers instead of with pliers are advantages Bennett says he finds in the use of these coolers.

• Increased payments in social security benefits became effective July 1 last. We suggest that all persons drawing these benefits apply at their nearest Social Security office for further information as to how they may take advantage of the increase.

• At the season's closing meeting of the 25-30 Club, a life membership card was presented to Al Kaye, past president. The presentation was made by Morris J. Rotker, also a past president of the Club. Kaye is an IA old-timer, having held membership in Local 384, Hudson County, N. J., since June 1915, and has served the Local in various official capacities. He has been employed for the past 29 years at Warner Bros.' De Witt Theatre in Bayonne, N. J.

Al Kaye is active in Masonic circles and is a member of Menorah Lodge No. 249 F. & A. M. (Bayonne), and Master in 1942. He also holds membership in the Past Masters Ass'n of Hudson County, N. J. He has been a member of Arion Lodge K. of P. No. 68, Bayonne, N. J. for the past 32 years; past president of the Theatrical Square Club No. 1 of New Jersey, and is a member of many other fraternal and benevolent organizations.

• In honor of the 40th anniversary celebration of Local 253, Rochester, N. Y., the New York State Association held its Spring-Summer meeting on July 16 at the Moose Club in Rochester. At the conclusion of the Association meeting, the delegates and their wives were the guests of Local 253 at a delicious steak dinner. Lou Levin, president of the Rochester Local, and Roy Fisher, the Local's first president, greeted the guests and made the welcoming speeches. A gala floor show followed the dinner and the festivities did not end until the wee hours of the morning. All present agreed that it was one of the most enjoyable events of the season.

• Negotiations are pending between New York Local 306 and the theater circuit heads on new contracts to replace the ones which expire the end of this month. The Local is asking for a 13% wage increase plus an additional 2% boost in its welfare fund—from 5- to 7%.

• The newly formed IA Local 839 (Motion Picture Screen Cartoonists) got off to a flying start with the new two-year agreement it reached with the Animated Film Producers Ass'n. The contract provides for a 10% increase in salary, retroactive to March 15 last.

The American Labor Movement

Officially titled "A Brief History of the American Labor Movement", the following was prepared by the Department of Labor for use of the State Department's labor attachés abroad. It traces the growth of labor union activities and labor legislation from Colonial times to the second Truman Administration.

Chapter I. Early Organization

UNIONS have a long history in the United States. Even before the Declaration of Independence, skilled artisans in handicraft and domestic industry joined together in benevolent societies, primarily in order to provide members and their families with financial assistance in the event of serious illness, debt, or death of the wage earner. Although these early associations had few of the characteristics of present-day labor unions, they did bring workers together to consider problems of mutual concern and to devise ways and means for their solution.

Crafts such as those of carpenters, shoemakers, and printers formed separate organizations in Philadelphia, New York, and Boston as early as 1791, largely to resist wage reductions. These unions were confined to local areas and were usually weak because they seldom included all the workers of a craft. Generally, they continued in existence for only a short time. In addition to the welfare activities, these unions frequently sought higher wages, minimum rates, shorter hours, enforcement of apprenticeship regulations, and establishment of the principle of exclusive union hiring, later known as the "closed shop."

Many characteristic union techniques were first developed in this period. For example, by the beginning of the nineteenth century the principle of collective bargaining was already well understood in labor and employing circles and was frequently applied in disputes. The first recorded meeting of worker and employer representatives for discussion of labor demands occurred between the Philadelphia shoemakers and their employers in 1799. The printing crafts of Philadelphia and New York rapidly followed suit.

Also, a forerunner of the union "business agent" grew out of the need to check on shops to see whether they were adhering to the union wage scale. The early "tramping committees" and unpaid representatives later led to specialized, paid agents known as "walking delegates."

Strikes, during which workmen quit their employment in a body, paralleled the development of organization and collective bargaining. The New York bakers were said to have stopped work to enforce their demands as early as 1741, although this action was directed more against the local government, which set the price of bread, rather than against the employers. The first authenticated strike was called in 1786 by the Philadelphia printers who provided benefits for their striking members.

A sympathetic strike of shoe workers in support of fellow bootmakers occurred in 1799 in the same city. In 1805, the shoemakers of New York created a "permanent" strike benefit fund, and in 1809, these same workers participated in what was perhaps the first "general" strike when they extended strike action against one employer to include several others who had come to his aid.

Employer Opposition

As unions became stronger the wage question increased in importance and employers formed organizations to resist wage demands. Where circumstances appeared favorable, employers attempted to destroy the effectiveness of a union by hiring nonunion workers and by appealing to the courts to declare the labor organization illegal. The legal fight against unions was carried through the courts in Philadelphia, New York, and Pittsburgh between 1806 and 1814. Unions were prosecuted as "conspiracies in restraint of trade" under an old English common law doctrine that combinations of workmen to raise wages could be regarded as a conspiracy against the public.

The attempt of courts to apply this doctrine of conspiracy aroused a controversy which lasted throughout most of the nineteenth century. Slowly judicial attention was shifted from the question as to whether a mere combination of workmen was a conspiracy to one as to the means they used to gain their ends. Thus while unions, as such, became regarded as "lawful," strikes, boycotts, and other attempts of workers to secure their demands were the subject of legal action in the courts for many decades.

The early conspiracy cases against labor organizations, combined with a business recession following the Napoleonic wars in Europe, seriously affected the trade-unions, many of which passed out of existence. After a low point in membership in 1820, however, worker organizations again sprang up in the larger cities among hatters, tailors, weavers, nailers, and cabinetmakers. Organizations of factory workers also appeared for the first time during this period.

Between 1827 and 1832 workers' organizations gradually turned to independent political activity. The factors leading to this development are explained by the historian, Mary Beard, who, in *A Short History of the American Labor Movement*, says:

> In the first place, property qualifications on the right to vote, which had been imposed by the first state constitutions, were abandoned and the ballot put into the hands of practically every workingman. In the second place, the prosecutions of labor unions in the courts of law had driven workingmen to a concerted action which rose above trade and craft lines. In the third place, the industrial revolution brought about by steam power and the factory system was making swift headway in creating great cities. It added rapidly to the number of industrial workers and created closer associations among them. In the fourth place, the idea was being advanced that the hours of labor should be fixed universally at ten per day by legislation rather than by the painful method of strike.

The movement among workers seeking to improve their status by political action spread to many leading industrial communities. In Philadelphia a number of craft unions formed the Mechanics' Union of Trade Associations in 1827. This city-wide group soon began to nominate and elect candidates to "represent the interests of the working classes" in the Philadelphia city council and the Pennsylvania State Legislature. Local labor parties organized by workers also sprang up in many States.

Early Efforts of Unions in Politics

Political programs, supported by 50 or more labor papers, included such demands as the following: the 10-hour day, restriction of child labor, abolition of convict labor competition, free and equal public education, abolition of imprisonment for debt, exemption of wages and tools from seizure for debt, the right of mechanics to file liens on property to secure payment of their wages, and the abolition of home and factory sweatshops.

With the rise of political organizations of workingmen, which soon assumed the typical forms of American political parties—ward and county committees, and conventions—much of the strictly economic activity of the trade-union movement was discontinued, and the number of organizations along craft lines declined.

For a short time, these labor organizations were successful in electing their candidates to various public offices, but in general, they failed to attain their aims. Nevertheless, they called the attention of the regular political parties and the public at large to the social and

economic inequalities experienced by workers, and by so doing helped to shape the course of much future legislation. Eventually, State legislatures prohibited imprisonment for debt, enacted the 10-hour day for women and children, and laid the foundation of the American free public school system.

In the early 1830's the interest of workers in reform movements and political action declined. To offset the rapidly rising prices between 1835 and 1837, they turned with renewed vigor to the organization of craft or trade-unions. By 1836, for example, over 50 local unions were active in Philadelphia and New York City.

City Centrals and National Unions

Workers also organized craft unions in other cities, such as Newark, Boston, Cincinnati, Pittsburgh, and Louisville. This rapid growth led to the formation of union groups on a city-wide basis. These "city central" organizations, or "trades' unions," as they were called at the time, gave primary attention to the discussion of problems of common interest and to the promotion of union-made goods.

Organization of union groups beyond a single local area was first tried in 1834 when city central bodies from seven cities met in New York to form the National Trades' Union. Later, in 1835 and 1836, the cordwainers, typographers, combmakers, carpenters, and hand-loom weavers endeavored to set up country-wide organizations of their separate crafts. These experiments in federation, however, did not withstand the financial panic of 1837 and the period of depression and unemployment which followed during most of the forties.

The Era of "Utopianism"

As the depression took its toll of local as well as national unions, workmen in many places turned their efforts toward forming producers' and consumers' cooperatives. Others were attracted by various schemes for cooperative communities stimulated by the "utopian" idea spread by the followers of the French Socialist Charles Fourier, by the English reformer Robert Owen, and by many other intellectuals of the period.

Community ownership of land and productive tools, like that tried in the well-known Brook Farm venture in Massachusetts and at the New Harmony colony in Indiana, was urged as the solution to poverty, unemployment, and the other social and economic ills besetting labor. Although widely discussed in labor groups, these schemes received little direct support from workers themselves. They did, however, divert workers' efforts from union activities into disputes over political and economic theories.

In this period, also, the "homestead movement" was born. In its simplest term it was a proposal that the Government give plots of undeveloped public land to persons who wished to settle and cultivate them. This movement, in the words of the labor historian, Selig Perlman, in *A History of Trade Unionism in the United States*, was a demand that the Government "open an escape to the worker from the wage system into self-employment by way of free land," and it dominated American politics during the fifties and sixties.

By the late 1840's industry had revived, labor was in great demand, prices were climbing upward, and trade-unions

(*Continued on page* 27)

New Twin Screen Drive-In Has Duplex Projection Room

ALEXANDRIA, Louisiana's new Joy Twin Drive-In is unique in that it has two screens—one at either end—and a four-mechanism projection room that projects two different pictures simultaneously and in opposite directions. It has a capacity of 850 cars, plus 200 seats located at the concession building.

As shown in the illustration below, the box office is centrally located. Patrons entering may choose which of the two features they want to see first. Intermissions, however, are staggered in order to minimze congestion at concession counters and exits.

The projection room faces both ways and is equipped with two complete projection and sound installations, one for each screen. Both operate simultaneously, of course. Both installations are almost identical, consisting of Motiograph AA mechanisms and Motiograph sound throughout. The only difference is that where one includes two Motiograph 90-ampere lamps and one 125-ampere Motiograph generator, the other system has two Strong Mighty 90 lamps powered by two Strong rectifiers. Each of the two screens measures 40 x 57 feet, and the throw in each case is 487 feet.

Projectionists are provided with their own toilet facilities and with a shower. By arrangement with Alexandria, Local 400, the Joy Twin is operated by two projectionists, who are pictured here. Above left is D. L. Coker with W. Martin Lipscomb, business representative of Local 400; above J. D. (Jerry) Clark. All equipment was installed by members of Local 400, under guidance of Harold Ballum, engineer for Hodges Theater Supply of New Orleans.

Owner of the Joy Twin is a syndicate including, among others, Joy N. Houck, A. J. Rosenthal and Bernie Rosenthal, Jr.

16-mm

BECAUSE EXPANSION OF 16-mm ACTIVITY PROVIDES INCREASING FIELDS OF EMPLOYMENT FOR SKILLED PROFESSIONAL PROJECTIONISTS IN Tv STUDIOS AND NON-THEATRICAL SHOWINGS, AS WELL AS ENHANCED POSSIBILITIES OF PERSONAL BUSINESS VENTURES, THIS NEW DEPARTMENT OF IP WILL APPEAR MONTHLY HEREAFTER.

16-mm Audio-Visual Show Draws Thousands

Narrow-gauge film users and producers, and equipment manufacturers, stage multiple-organization convention and trade show displaying broad variety of items for entertainment, educational, religious, industrial and business use.

THOUSANDS of projectionists, educators, churchmen, showmen and salesmen gathered in Chicago July 31st to August 5th to see the displays of 16-mm and other "audio-visual" equipment at the Hotel Sherman, and to attend the conventions of national audio-visual organizations simultaneously held there.

Four of these national organizations, made up of users or suppliers of 16-mm and related equipments are: National Audio-Visual Association (NAVA), Educational Film Library Association (EFLA), Catholic Audio-Visual Educators (CAVE), and Industrial Audio-Visual Association (IAVA). Other groups holding concurrent meetings included the Committee on Radio and Recordings of the Department of Audio-Visual Instruction of the National Education Association (NEA), the Film Council of America, the Association of Chief State School Audio-Visual Officers, and the State Directors of Audio-Visual Education.

Audio-Visual

"Audio-visual" is the term used to group still or motion pictures, three-dimensional objects, and sound records recorded on film or otherwise, when these are used for non-entertainment purposes related to education, religion, training, advertising or sales. It embraces all motion picture projection so used, including 35-mm, 16-mm and 8-mm sound and silent films. Sixteen-mm sound films predominate heavily. It also embraces projected slides and slide-strips. The latter usually consist of frames on 35-mm stock, projected singly and in slow succession; the still image thus projected may be as small as the page of a book, or fill a large screen. (Salesmen project book-size images to interest or inform their prospects; using tiny, portable, battery-powered projectors, a number of which were on exhibit.)

One product on display, is a device to test audience reaction to anything, including a motion picture. Called the Group-Thinkometer, it consists of a meter box, containing a meter and dry cells, and from 4 to 50 cables terminating in switches. These switches are distributed among the audience which is instructed to press them when interested, or bored, or pleased, or displeased, according to the reaction to be tested. The meter's dial is calibrated to show how many switches are closed at any given moment; and its needle moves back and forth along the dial as switches are closed or released. This device is used by educators and others to edit film; sequences to which the test audience gives a "disinterested" reaction being eliminated or reduced as much as possible.

Other exhibits included a wide variety of perforated and solid screens, portable and non-portable, for projection of still and motion pictures in all sizes from book-page up to theatre dimensions. Da-Lite Screen Company alone unveiled four new screen models, including one intended for stereo projection (with the audience wearing stereo spectacles).

The largest single exhibit appeared to be RCA's, presenting among other items a number of varieties of that company's Model 400 Senior and Junior 16-mm sound projector. (IP for June, Page 22.)

Approximately half of the booths were occupied by manufacturers, not of equipment, but of 16-mm and 8-mm films, and of slides and slide-strips. Many of these displayed bulky catalogs listing their products; these in some cases were given away, but other producers sold theirs. Two of the catalogs sold were products of the Library of Congress which list and describe copyrighted films and filmstrips.

Censorship troubles afflict narrow-gauge films as well as the theatre, and were the subject of three resolutions recommended to the EFLA. One called for adoption of the American Library Association's Bill of Rights as it pertains to film censorship; another for cooperation with Film Council of America in implementing that bill of rights, and a third requested NEA's bibliography of those who are considered to have been attacking freedom of education.

NAVA devoted a closed panel discussion to specific problems of entertainment films, including a proposed code of ethics for the 16-mm entertainment business. This panel also considered: "What can we do as an industry, and through our Association, to create new business in the (16-mm) entertainment field?"

The IAVA took up, among other matters, "What can be done to develop a set of recognized standards and costs of projection service for business and industry?" Also: "The problem of special equipment for business conventions and exhibits."

Floyd E. Brooker, of the Mutual Security Agency, told the EFLA some of the conclusions he drew from a recent eleven-week round-the-world tour to study audio-visual practices and needs. Audio-visual aids, he found, were exceptionally helpful in health education and other fundamental education in areas where illiteracy or language barriers retard other methods of communicating information. The Mutual Security Agency, he revealed, has sent a thousand technical training films to Europe, for translation and distribution; and is encouraging local production of a-v films and filmstrips in Italy, Greece and Turkey.

Organizations Participating

NAVA is the trade association of the audio-visual field. Its membership numbers approximately 600 manufacturers of a-v equipment, producers of a-v films and other materials, and a-v dealers. The gathering at Chicago was its seventh annual convention and trade show. CAVE, however, was participating for the first time, this being the first meeting of the kind for Catholic educators in the field of a-v teaching aids. EFLA was organized in 1943. It distributes educationally-produced films and publica-

High Speed Movie Technique "Magnifies Time"

A new 15-minute, 16-mm sound motion picture which provides a concise graphic demonstration of the ability of a high-speed motion picture camera to "magnify time" has been announced by Eastman Kodak Co.

The film "Magnifying Time with the Kodak High-Speed Camera" begins with the statement that time is no longer bound by the clock; that time control is now possible with a high-speed motion picture camera. To prove the point, and to show various applications of the camera, the film proceeds to illustrate how every movement from dropping an egg in a frying pan to the implosion of television tubes can be slowed down to a snail's pace for leisurely study and analysis. Sequences in this series include motion picture studies of explosions, the operation of relays, studies of cam action, the performance of a solenoid-operated curtain, and vacuum coating of metals and plastics.

During the course of the demonstration the film points out that since the Kodak High-Speed Camera exposes 100 feet of motion picture film in about 3 seconds—while the film whizzes along at approximately 50 miles an hour—time is multiplied by a factor of about 200 and as a result any movement or action which is too fast for the eye to follow in the normal course of events can be readily studied on high-speed film. This will provide the engineer or researcher with the rare advantage of seeing what really happens when things take place "quick as a wink." The camera, the film points out, literally "sees into the invisible."

"Magnifying Time" will be available on loan without charge to businesses, industries, organizations, and schools interested in the subject of high speed movies. Bookings can be arranged by addressing Camera Club and School Service, Eastman Kodak Co.

AUDIO-VISUAL SHOW

(*Continued from preceding page*)

tions and acts as an information service on educational films; its membership includes colleges and universities, public libraries, church groups, and film producers and distributors. IAVA's members are the a-v department heads of industrial firms that use a-v materials and equipment for sales, advertising, employe training and other purposes—companies such as Shell Oil, Swift, Illinois Bell Telephone Co., and the like.

Manufacturers Participating

Manufacturers exhibiting, and the products they displayed, included the following among others:

Ampro Corp.: 16-mm Premier-30 projector, magneto-optical recording 16-mm projectors, tape recorder.

Audio-Master Corp.: Tape recorders, slidefilms, etc.

Audio-Visual Supply Co.: rewinder, filmstrip cleaner, electric timing device.

Automatic Projection Corp.: 35-mm slidefilm projectors.

Bausch & Lomb Optical Company: slide projectors.

Bell & Howell Co.: 16-mm sound projectors and related equipment.

Califone Corp.: Sound systems, tape recorder.

Compco Corp.: reels, cans, shipping cases, slide-making material.

Crestwood Recorder Corp.: tape recorders.

Da-Lite Screen Co.: screens and tripod screens.

De Vry Corp.: 16-mm sound projectors, including the A-N model.

Du Kane Corp.: slidefilm projectors, filmstrip projectors, tape recorders.

Eastman Kodak Co.: 16-mm projectors and cameras, motion picture accessories, slide projectors.

Electro - Chemical Products Corp.: Anti-static film cleaner and conditioner.

Electro Engineering and Manufacturing Co.: slidefilm equipment.

Forway Industries, Inc.: 16-mm sound projectors, film editing device.

FR Corp.: 35-mm slide projection viewer.

GoldE Manufacturing Co.: slide projectors, slide changers, accessories.

Hamilton Electronics Corp.: public address equipment.

Harwald Co.: the Group-Thinkometer, film inspection device, slide projector.

Masco Electronic Sales Corp.: tape recorders, public address equipment.

O. J. McClure Talking Pictures: slidefilm projectors, public address equipment.

Monson Corp.: tape recorder and accessories.

Movie-Mite Corp.: 16-mm sound projector, 8-mm magnetic sound projector.

Newcomb Audio Products Co.: transcription players.

Newmade Products Corp.: complete film library equipment.

Paillard Products, Inc.: stereoptical projector with magnetic sound.

Pentron Corp.: tape recorders and players, mike mixer, accessories.

Radiant Manufacturing Co.: tripod, wall and ceiling projection screens.

RCA: 16-mm sound-silent motion picture projectors, magnetic recorder-projector, a-v accessories.

Reeves Soundcraft Corp.: magnetic recording tape and "magna-stripe" for addition to silent prints.

Rek-O-Kut Co.: disc recorders, high-fidelity record players, variable-speed record players.

Spindler & Sauppe: slide projector with remote control, projection screen.

Standard Projector and Equipment Co.: filmstrip and slide projector.

Strong Electric Corp.: AC arc slide projector for large screens.

Television Associates: projection screens.

Three Dimension Co.: filmstrip projectors.

Victor Animatograph Corp.: 16-mm sound motion picture projectors; magnetic sound attachment for same, accessories.

Viewlex, Inc.: slide and filmstrip projectors, combinations of same, automatic and remote control variations of same.

Vita-Lite Screen Co.: glass and plastic moulded screens.

Wallach and Associates: disc and tape record cabinets.

Webster Electric Co.: tape recorders.

Webster-Chicago Corp.: tape and wire magnetic recorders.

Westinghouse Electric Corp.: projection lamps and photographic lamps.

New M-G Shown at IA Meet

Among features of the IATSE 41st Convention at Minneapolis was the demonstration, by Jack Behlke of Local 110, Chicago, of a new Motiograph motor-generator designed for one-kilowatt arc lamps. Behlke put the device on display at a local hotel.

The equipment consists of a control cabinet and M-G unit. The cabinet mounts an on-off switch; two ammeters, one for each lamp; and two rheostats, one for each lamp. The M-G proper consists of a 4 hp, 220-volt, single phase 60 cycle ac driving motor, and two dc generators, one shafted at either side of the motor. The generators are rated at 50 amperes, and compounded to need no ballast. Regulation is claimed to be exceptionally good in cases of unfavorable line voltage variation. Floor space required is 36 inches x 14 inches; the M-G stands 18 inches high and weighs approximately 240 pounds.

Magnetic Tracks for 8-mm Prints

Reeves Soundcraft Corporation, manufacturers of "Magna-Stripe" magnetic tracks for use on 35-mm and 16-mm prints, have now brought out a similar track that can be bonded to 8-mm silent prints. By recording any sound he pleases on that track the owner converts his silent 8-mm prints to sound. Cost is 3½ cents per foot.

Best Devices Moves

Best Devices Company, Inc., manufacturer of projection port fire shutters and of carbon savers, has moved to its own new factory building at 10921 Briggs Road, Cleveland, Ohio. John MacNellis, who recently acquired ownership of the organization, announced the change.

Eastman Kodak's 25 and Pageant 16-mm Projectors

UNIQUE in many ways in the 16-mm field the Eastman Kodak Model 25, Figure 1, can be operated either with an incandescent light source (as shown) or with an arc light source. It has a Geneva cross intermittent movement in place of the more common claw intermittent—but a Geneva cross with eight instead of the usual four points; and has five separate drive motors instead of one. Other unusual features include a single-blade shutter running at double normal speed (the same blade serving both for cut-off and balance); turret-mounted projection incandescents for instant changeover in case of burnout; and coiled-spring coupling to the more important drive motors in place of direct shaft-coupling.

The Eastman Model 25 was not designed to compete in the lower-priced 16-mm field but rather to compete in quality of presentation, so far as possible, with the very finest 35-mm projection.

Electrical Circuits

Some of the manufacturer's performance specifications are:

Projection: horizontal unsteadiness, less than 0.00025 inch; vertical unsteadiness, less than 0.0005 inch. Illumination, shutter running, no film: tungsten, 450 lumens; arc with heat glass in place for black-and-white film, 2000 lumens; without heat glass for color film, 2500 lumens. Screen width: up to 22 feet.

Sound: signal to noise ratio, 55 db; flutter, less than 0.2%; intermodulation distortion, 5% including scanning beam and amplifiers. Sound power: up to 30 watts.

Incandescent projection utilizes 1000-watt T-12 lamps, mounted base-up in the lamp turret. A lever at the top of the projector is used to rotate the turret, bringing the spare lamp into action instantly, in event of failure.

Arc projection utilizes a lamphouse and tube-type rectifier made for the Eastman Model 25 by Strong Electric Company. The lamp burns 45 amperes at 30 volts and is trimmed with a 7-mm x 12″ Suprex positive and 6-mm x 9″ Orotip C negative.

The intermittent movement is driven by its own, 1440 rpm synchronous motor, which is not burdened with any other duty whatever. The motor is coupled to the movement by a coiled spring, not rigidly. Two off-center driving elements, known as "accelerators," are also interposed between movement and motor. The result is a pull-down acceleration of 57 degrees instead of the more usual 135 degrees.

The other sprockets, and the shutter, comprise a separate mechanical assembly of their own, vibration-isolated from the intermittent; however shutter and intermittent must of course be phased to each other. Therefore, also, special gears mechanically link the two assemblages during the starting period; as the two motors come up to speed and to phase, these gear teeth float apart. The shutter motor operates at exactly twice the speed of the intermittent motor—namely, 2880 rpm. The shutter has only a single blade, which intercepts the light twice each frame. This arrangement is another step toward attaining the absolute maximum possible illumination. The shutter-sprocket assembly, like the intermittent movement, is spring-coupled to its driving motor.

FIG. 1. Model 25 16-mm projector, with 8-point Geneva cross intermittent movement and single-blade shutter, as used for incandescent projection.

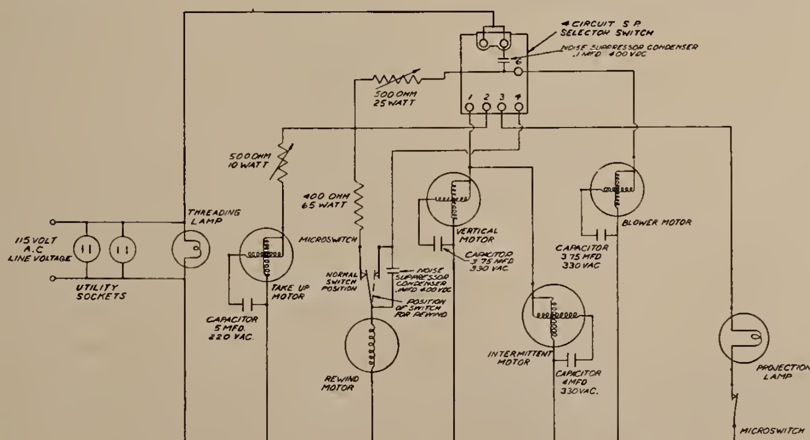


FIG. 2. Model 25 projector schematic circuit.

The take-up spindle, the rewind spindle, and the cooling blower, each have separate motors of their own, making a total of 5 motors in all. The schematic of these arrangements is shown in Figure 2, in which the "vertical" motor is the 2880 rpm unit that drives the shutter-sprocket assembly.

Performance Specifications

The amplifier (with the exciter lamp power supply) is plugged in, during installation, to one of the two "utility" outlets shown in Figure 2; it may also, depending on local circumstances, be plugged into an independent ac source.

The power supply is equipped with a full-wave stack rectifier, its output filtered by an Altec-Lansing TMQ-501 inductor and four 3,000 microfarad capacitors. It delivers a 6-volt dc output to the exciter lamp.

Amplifier arrangements comprise two units, a pre-amplifier and power amplifier. The former derives its power supply from the latter, contains automatic voltage stabilization and two stages of audio. The power amplifier contains two stages of audio amplification, succeeded by a cathode-follower phase-inverter stage and a push-pull output stage.

Operating power is derived from a full-wave rectifier tube, 5U4G. Output may be fed to any of a number of speaker arrangements, according to local require-

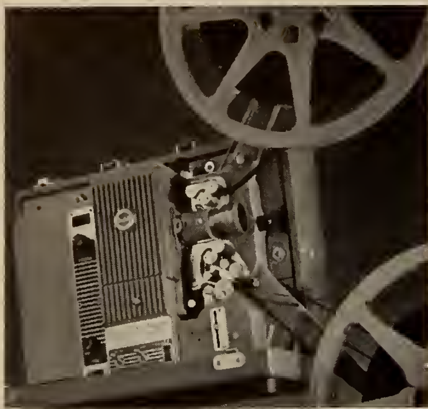


FIG. 3. Pageant 16-mm projector, with claw-and-cam interm.ttent movement and incandescent projection.

ments. including Altec-Lansing theatre-type speakers. Provisions are included for input from microphone or other auxiliary sound source; for separate control of low frequency and high frequency volume; overall volume control. and silent operation.

Service can be obtained from Altec Service Corporation.

* * *

The Eastman Kodak "Pageant" 16-mm sound projector (Figure 3) is an incandescent - illuminated, claw - intermittent portable unit, with an 8-inch loudspeaker in a removable section of the carrying case. Spare reel. reel arms, power cable, speaker cable and spare projection lamp are also fitted inside the same case. The unit as a whole may be plugged into either an ac or dc 110 volt line.

The projection lamp may be either 750 or 1000 watt, T-12; nothing higher than a 750-volt lamp, however, should be used with dc. The motor is a series-wound universal type. Amplifier and exciter lamp circuits are ac-dc, with selenium stack rectifiers. Amplifier gain is provided by three triode stages followed by phase inverter and push-pull pentode output, to deliver a rated maximum of 7 watts to the 8-inch speaker. Inverse feedback is obtained from an independent secondary on the output transformer. Current to the 7-volt, 0.2 ampere T-5 exciter is supplied via a 250 ma. selenium rectifier, in series with the amplifier tube filaments. Amplifier plate power is drawn from the 110-volt line via a push-pull pair of 75 ma. selenium rectifiers.

Controls provided include motor and lamp switches; silent-sound speed and rewind levers; volume and tone control, and a "fidelity" lever that affords effortless refocussing of the exciter lamp to match the type of sound track. Motor speed is automatically controlled by a governor that short-circuits a 100-ohm series resistor as required.

The amplifier and loudspeaker circuits of the Pageant sound projector can be used to accompany silent prints with either microphone comment or phono music; or they may be used without film as a pa system. Provision is made in the amplifier for high-impedance microphone input; and Eastman Kodak also supplies a phono adapter, consisting electrically of a 0.1 mfd. condenser and a 1.0 megohm resistor in series.

A portable carrying-case with three speakers, which slides apart to form three individual speakers each mounted on its own baffle, is an auxiliary unit recommended for use in larger auditoriums, or in locations with unsatisfactory acoustics. By means of this auxiliary, a four-speaker set-up can be arranged to assure satisfactory audience coverage under otherwise unfavorable conditions. Two of the triplex speakers are provided with 45-foot connecting cords (and plugs), the other with a 35-foot cord, and plug.

The instruction book accompanying the Pageant projector contains thoroughly illustrated, detailed information on setting up the equipment, checking prior to switching on, rewinding, and

(*Continued on page* 25)

IA-IP Amateur Radio Bulletins

By AMOS KANAGA, W6BAA

Secretary, Local 409, San Mateo, Calif.

ALTHOUGH IP has given us a monthly column devoted to our activities, and the gesture was greatly appreciated by the gang, what I failed to realize is that editors have deadlines . . . well, we were pretty worried for this month until we received (late of course) a stack of mail from the IA radio gang. One letter from our old friend VE7ALW Merle Wilson of Vancouver Local 348 enclosed the additional fifteen QSO's he needed to qualify for the Gold Award. Now that alone is very FB but he also told of something few of us have given much thought to, and that is the fact that some of our IA gang have already received their WN licenses. To top that he passed on the additional data that a few more were trying to get a WN license, and some of the IA men wanted to but didn't know how to go about it.

Well, brothers, I guess we just couldn't see the forest for the trees, so for the benefit of those of you who would like to become radio hams here is the pitch.

The FCC recently has made available a special license for those who want to get started in amateur radio. It is called a Novice license and is quite easy to obtain in comparison to the advanced class such as the IA men listed in IP have. For example, you only need to be able to copy 5 words of code a minute and the questions on theory are much simpler. Now this license is good for one year and allows operation on several ham bands. At the end of that time you will no doubt have enough experience to then qualify for a regular Class B license.

We have obtained from the ARRL (American Radio Relay League) some pamphlets on this Novice license telling all about it. These are available to any IA Brother for the asking, but send the request to me directly. There is also a license manual available in the form of

(*Continued on page* 29)

IA-IP "BOX SCORE"

"Worked 10 IA-IP"

No. 1	W4PKT	Marion Sanders	Local 507
No. 2	W1BVB	Don Fancher	Local 439
No. 3	W6BAA	Amos Kanaga	Local 409
No. 4	VE7ALW	Merle Wilson	Local 348
No. 5	W6FOP	George Abrams	Local 297
No. 6	W6MU	A. Houston Barnett	Local 695
No. 7	W6PFF	Frank Champlain	Local 150
No. 8	WφGSW	James Evans	Local 242
No. 9	WφSJK	O. S. Keay	Local 219

"Worked 25 IA-IP"

No. 1	W6PFF	Frank Champlain	Local 150
No. 2	W6MU	A. Houston Barnett	Local 695
No. 3	W6BAA	Amos Kanaga	Local 409
No. 4	W6DDQ	Phillip Wisdom	Local 695
No. 5	VE7ALW	Merle Wilson	Local 348

Note: If your call and name does not appear this month log received too late to verify. Send all log copies to W6BAA Amos Kanaga, 262 La Casa Avenue, San Mateo, California.

New Sound for 16-mm and 8-mm

Further increasing the usefulness of 16-mm (and even 8-mm) prints, a new method of providing them with synchronized magnetic sound, just announced by Revere Camera Company, works equally well with sound or silent prints, and does not require any modification or treatment of the print itself.

The Revere method somewhat resembles the very earliest theatre "talkies"—in which the sound was on a separate disc record that played in synchronism with the film—except that in the Revere procedure the separate record is a magnetic tape and not a phonograph disc. A stroboscopic arrangement, used both in recording and in projection, protects the synchronization. If there is sound already on the print, it may or may not be used; the separate, subsequently recorded, magnetic tape sound can be substituted; or the two can be alternated, or mixed, as desired.

Any standard tape recorder and 16-mm or 8-mm projector (any 35-mm projector for that matter, although the manufacturer does not specifically say so) can be used. The magnetic tape on which the sound is to be recorded is special, Revere Sound-Movie Tape, marked to enable the operator to observe and correct synchronism by stroboscopic striations. Each reel of tape is accompanied by a "Synchro-Reflector."

To record, a pinhole "start" mark is made in the film, which is threaded in the normal way. The Synchro-Reflector is mounted to divert a fractional percentage of the projection light to the surface of the magnetic tape. When the "start" signal appears on the screen the tape recorder is switched on and either projector speed or recorder speed adjusted until the stroboscopic reaction between the projector shutter and the markings on the tape cause the tape to *appear* to stand still. The recordist now speaks into the microphone or plays his phonograph or otherwise records on the tape whatever sound he pleases. If at any time the stroboscopic illusion on the tape appears to move, the speed controls are readjusted as necessary.

Playback procedure is identical except that the tape recorder is switched to "play" instead of record. Depending on local arrangements sound can be played either from the magnetic tape or from any track that may exist on the film, or a simple mixer circuit may be added to blend the two. The synchronized magnetic record can of course be erased, edited or re-recorded at any time.

This latest Revere development adds still a further touch of versatility to the many services already obtainable from narrow-gauge film in association with optical and magnetic soundtracks.

Accepted Standards for 16-mm Projection

II

Freedom from Travel Ghost Z22.54-1946

1. Scope and Purpose

1.1 This standard describes a method of determining freedom from travel ghost in 16-mm sound motion picture projectors.

2. Definition

2.1 Travel ghost is a blurring effect seen on the screen and evidenced by vertical tails or light streaks added to the projected images of the transparent areas on the test film. It is caused by the projector shutter being out of synchronism with the intermittent mechanism, either by faulty adjustment or faulty design.

3. Test Film

3.1 The test film used for determining freedom from travel ghost shall carry a pattern of small transparent areas upon a dark background. There shall be at least six transparent areas, three of which shall be located not farther than 1/32 inch from the top of the frame and three not farther than 1/32 inch from the bottom of the frame. Four of the areas shall have their edges 1/32 inch from a side edge and either the top or bottom edge of the frame. The density of the transparent areas shall be less than 0.2 and the density of the dark background shall be greater than 2.2.

FIG. 1. Typical test pattern (X by approximately 8 diameters). This pattern, although still officially standard, is now used only for military testing and has been informally replaced, for industrial testing, by a "T" target.

3.1.1 *Standard Length of Film.* The standard length of test film shall be 100 feet.

3.1.2 *Leader and Trailer.* Each test film shall have a suitable leader, title, and trailer.

4. Test Method

4.1 A test film in accordance with 2.1 shall be projected at standard sound speed of 24 frames per second (± 2 percent) upon a white matte screen, the projected image of the projector picture aperture being of such size that a screen brightness of 10-foot lamberts is obtained with the projector shutter running, but with no film in the gate. The screen image of the test film shall be viewed from a distance equal to twice its width and the presence or absence of travel ghost noted.

400-Cycle Signal Level Test Film (Z22.45-1946)

1. Scope and Purpose

1.1 This specification describes a 400-cycle signal level test film for use in testing 16-mm sound motion picture projection equipment.

2. Test Film

2.1 *Recording.* The test film shall have an originally recorded direct playback positive variable-area sound track recorded at an amplitude of 0.048 ± 0.0015 inch. The frequency of the recording shall be within ± 8 cycles of nominal frequency.

The density of the dark portion of the sound track shall be between 1.7 and 2.0. The density throughout the length of the film shall be as uniform as is consistent with the state of the art.

The combined base and fog density, measured as visual diffuse density, shall be 0.05 ± 0.01 when measured on an integrating sphere densitometer or a polarization densitometer.

The wave form distortion of the recording shall not exceed 5 percent.

2.2 *Film Stock.* The film stock used for the test film shall be cut and perforated in accordance with the American Standard 16-Mm Sound Motion Picture Film; Cutting and Perforating for Negative and Positive Raw Stock, Z22.12-1941, or latest revision thereof.

2.2.1 *Resistance to Shrinkage.* The film stock used for the test film shall have a maximum lengthwise shrinkage of 0.50 percent when tested as follows: At least 20 strips of film approximately 31 inches in length shall be cut for measurement of shrinkage. After normal development and drying (not over + 80 F [+ 26.7 C]), the strips shall be placed at least ¼ inch apart in racks and kept for seven days in an oven maintained at + 120 F (+ 49 C) and a relative humidity of 20 percent. The strips shall then be removed, reconditioned thoroughly to 50 percent relative humidity at + 70 F (+ 21.1 C), and the shrinkage measured by an adaptation of the pin-gage method outlined in Research Paper RP-1051 of the National Bureau of Standards. The percent shrinkage shall then be calculated on the basis of deviation from the nominal dimension for the length of 100 consecutive perforation intervals given in American Standard Z22.12-1941, or latest revision thereof.

2.3 *Standard Length.* The standard length of the 400-cycle signal level test film shall be 100 feet.

2.4 *Measurement Requirements.* Each film shall be measured for amplitude of the modulation, for image density, and for combined base and fog density. The measurements shall be made at a point approximately midlength of the film and at points between 5 and 10 feet from each end. The results of the measurements shall be stated on a card furnished with each test film.

2.5 *Leader and Trailer.* Each test film shall be provided with a suitable leader, title, and trailer.

Buzz-Track Test Film (Z22.57-1947)

1. Scope and Purpose

1.1 This specification describes a buzz-track test film used for checking the position of the sound scanning beam in 16-mm motion picture sound reproducers.

2. Test Film

2.1 The test film shall have originally recorded 300-cycle and 1000-cycle signal tracks on either side of the central exposed strip as shown in Fig. 1. The position of the tracks, weave in running film on the recorder included, shall be in accordance with Fig. 1.

2.2 The central exposed strip and the exposed portions of the two signal tracks shall have a density of 1.6 + 0.4

2.3 *Film Stock.* The film stock used for the test film shall be cut and perforated in accordance with the American Standard Cutting and Perforating Dimensions for 16-Millimeter Sound Motion Picture Negative and Positive Raw Stock, Z22.12-1947 (Revision of Z22.12-1941), or the latest edition thereof approved by the American Standards Association.

2.3.1. *Resistance to Shrinkage.* The film stock used for the test film shall have a maximum lengthwise shrinkage of 0.50 percent when tested as follows: At least 20 strips of film approximately 31 inches in length shall be cut for measurement of shrinkage. After normal development and drying [not over + 80 F (+ 26.7 C)], the strips shall be placed at least ¼ inch apart in racks and kept for 7 days in an oven maintained at + 120 F (+ 49 C) and a relative humidity of 20 percent. The strips shall then be removed, reconditioned thoroughly to 50 percent relative humidity at 70 F (21.1 C), and the shrinkage measured by an adaptation of the pin-gage method outlined in Research Paper RP-1051 of the National Bureau of Standards. The percent shrinkage shall then be calculated on the basis of deviation from the nominal dimension for the length of 100 consecutive perforation intervals given in American Standard Z22.12-1947.

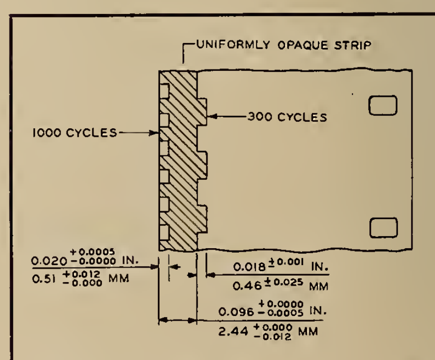


FIGURE 1

2.4 Each test film shall be provided with suitable leader and trailer, and a title or other markings to identify the film.

2.5 The standard length of test film shall be 100 feet.

16-mm Sound Projector Test Film (Z22.79-1950)

1. Scope and Purpose

1.1 This standard describes a film for qualitatively checking and adjusting 16-mm motion picture sound projection equipment and for judging the acoustical properties of the room in which the sound is reproduced.

2. Test Film

2.1 The film shall have a sound track and accompanying picture. The sound track shall comply with American Standard Sound Records and Scanning Area of 16-Mm Sound Motion Picture Prints, Z22.41-1946, and the film stock used shall be cut and perforated in accordance with American Standard Cutting and Perforating Dimensions for 16-Mm Sound Motion Picture Negative and Positive Raw Stock, Z22.12-1947, or any subsequent revisions thereof.

2.2 The test film shall contain samples selected from studio feature pictures in accordance with the American Standard for Theater Sound Test Film for 35-Mm Motion Picture Sound Reproducing Systems, Z22.60-1948, or any subsequent revisions thereof.

2.3 The assembled film shall contain picture reduced from the 35-mm sound test film, the dimensions of which shall comply with American Standard Location and Size of Picture Aperture of 16-Mm Sound Motion Picture Cameras, Z22.7-1941, or any subsequent revisions thereof.

2.4 The 16-mm release sound track shall be rerecorded from 35-mm original or release tracks through a rerecording channel, the electrical characteristics of which shall comply with current practices in the industry in rerecording 35-mm feature releases for 16-mm release.

2.5 Each film shall be provided with suitable head and tail leaders. The main title shall include the issue number of the film so that revised versions which may he issued periodically to conform to changing studio practices or to changes in the reproducing characteristic of the 16-mm sound projectors may be easily identified.

2.6 Each film shall be accompanied by an instruction sheet indicating the procedure to be used in checking and adjusting 16-mm projection equipment.

2.7 The length of the film shall be approximately 200 feet.

3. Method of Use

3.1 From a typical location in the room where the sound is reproduced, the observer should determine whether or not the frequency response characteristics of the complete reproducing system are normal by listening to the sound reproduced from the test film when the tone control is set normal and the volume control is set to reproduce the dialogue at normal sound level.

3.2 If the picture and sound quality are displeasing and the dialogue unintelligible, then either:

(*a*) The equipment should be adjusted as shown in the technical manual provided hy the manufacturer, or

(*b*) The room in which the sound is reproduced is not suitable.

Methods by which these factors may be determined should be included in the instruction sheet.

PARALLAX BARRIERS

(*Continued from page* 13)

control is effected by the real or apparent position of the electron source. Either a separate electron gun is used for each independent set of elements or the beam originating in a single electron gun may be successively shifted through the proper O points. Such cathode-ray tubes can be used in multi-trace oscilloscopes giving each trace a different color, or as multicolor radarscope for differentiating by color such things as moving targets, radar beacons, etc., but the most important application appears to be for color television in two-, three- or four-color sequential or simultaneous-type systems.

A large number of tricolor picture tubes are being built on this principle. At present the application of the parallax barrier principle in a cathode-ray tube represents one of the most promising solutions for an all-electronic color television viewing device.

KODAK 16-MM PROJECTORS

(*Continued from page* 22)

connection and use of accessories. Maintenance instructions cover cleaning of gate and aperture, of lenses and reflector, of sound drum and sound optics; replacing projection and exciter lamps, tubes (they can be changed with the amplifier in place), pecs and belts, and removing the amplifier.

A complete parts list is included and accompanied by an abundance of "breakdown" photographs, each labeled in detail to permit identification of each replacement part by its number. Electrical circuits are represented by both schematic and wiring diagrams of the projector as a whole and of the amplifier. Adequate electrical circuit data anent the phono adapter and the triplex loudspeaker are also included.

41ST IA CONVENTION

(*Continued from page 6*)

enough, in addition "we must be alert to keep out a substitution at the state or municipal level because those groups are now just waiting for the removal of the Federal tax to step in."

Benjamin Berger, President of the North Central Allied Independent Theatre Owners, stated that he had negotiated with the IA for 32 years as a theatre owner himself, and for seven years on behalf of the organization he heads, and "never had any serious trouble—never had any difficulty of any kind."

International Representative Roy Brewer told the Convention that the IA played an important part in stopping an important phase of Communist operation—an operation designed to infiltrate Hollywood in order to use motion pictures to influence world opinion.

Reverend Father F. J. Gilligan declared that Communism is bred of injustice, that in the United States labor organizations have secured a wider distribution of wealth and minimized injustice, and this is why Communism has not flourished here.

James L. McDevitt, National Director of Labor's League for Political Education, told the Convention that the Taft-Hartley act could be used to destroy any labor union in the United States by forcing expensive litigation upon it. U. S. Senator Hubert Humphrey (D.–Minn.) warned: "You will see what Mr. Taft-Hartley does to you" if there is a business recession and strike-breakers are called upon. "A law is not only what it does, but what it could do . . . not only how it is applied today but how it could be applied by a most unfriendly administration," he pointed out.

Indicative of the reputation of the IA for good citizenship extending beyond its own organizational interests is the number of speakers who saw fit to place before the delegates views on public affairs which could not possibly have any direct bearing on craft matters. Speaking of international relations, Sen. Humphrey said that the U. S. has been "the Good Samaritan of the Twentieth Century" yet the food and clothes sent abroad left no one hungry or naked here; technicians have been sent abroad yet American science keeps expanding. "We have been casting our bread on the waters, and it has been coming back a thousandfold. . . . We have fed the multitude with fishes and bread, and the more we feed, the more there is to eat."

George Grim, war correspondent and columnist with the Minneapolis Tribune, explained the situation in Korea: the enemy has never flown a bombing mission behind UN battle lines there and the UN in turn has never bombed Chinese territory. "I don't know who made the agreement, but there it is. If we were to fly over the border, they have 2300 planes to let fly at us." . . . The stall in the truce talks results from UN insistence on the rights of Communist prisoners of war, intended to counteract the impression left by older, imperialistic attitudes that regarded Orientals as inferiors. "Now our job is to try to prove to the people of the Orient and the Middle East that we believe in their individual integrity and dignity as much as our own. If you do not do that, you are going to lose. They control all the raw material, and they outnumber us . . . don't kid yourselves . . . we need them on our side. If they could ever be united under Communism, we would be clipped and done for. That is the reason for Korea, and why it is not settled."

Orville Freeman, candidate for Governor of Minnesota, addressing an audience composed mostly of persons who do not vote in Minnesota, reviewed the economic advances of the American people since 1939. Real income, taking prices into consideration has risen 41 per cent, he asserted, owner-occupied homes from 14 to 24 millions, owner-farmed farms from 56 to 78 per cent, farms with electricity from 70 to over 80 per cent. "We have built more roads and schools and hospitals than at any time in the history of this nation, and while we have done it we have fought a great war and are carrying the burden of meeting the threat of Communism and all these things are without parallel in the history of the world."

The Minneapolis and St. Paul newspapers played up the IA convention with detailed reports of the speeches and deliberations, often under two-column heads, and with "spreads" of pictures.

THE AMERICAN LABOR MOVEMENT

(*Continued from page* 18)

once more showed signs of activity. Workingmen again became interested in establishing rules governing apprenticeship, minimum wages, control over methods of payment, initiation fees, dues, strike benefit funds, union hiring procedures, the closed shop, and the exclusion from membership of all persons not working at the trade.

As industries spread, new locals were formed and by 1854 most important trades showed some degree of organization in the larger cities. Many of these unions collapsed only to be promptly revived and crushed again in 1857 in another downward sweep of the business cycle.

During the 1850's several national unions were founded. The printers' union held a national convention in 1850. By 1859, the stonecutters, hat finishers, molders, machinists, and locomotive engineers also had created national organizations. The decade was marked also by many strikes which, at one time or another, involved almost every known craft and the majority of American cities. Collective bargaining between unions and management, however, was slowly becoming more prevalent in several leading trades.

By 1860 there was a definite trend toward higher wages and shorter hours for workers. Adequate data are lacking to prove that this trend was a direct result of union activity. There are, however, scattered bits of evidence which indicate that the combined efforts of workers were responsible for at least a part of the improvement in working conditions.

For example, a letter written by President Martin Van Buren in 1840 to certain political inquirers states that: "The ten-hour system, originally devised by the mechanics and laborers themselves, has by my direction been adopted and uniformly carried out at all public establishments." A report of the Massachusetts Legislature for 1850 also tells that "the mechanics and laboring people * * * have established by mutual arrangement with their employers the 'ten hour system' of labor."

Specifically, the workday, often from sunrise to sunset early in the century, was shortened to 10 hours for most skilled artisans in the large cities by 1850. At this time factory workers were beginning to work from 11 to 12 hours a day. By 1860, the average workday for nonagricultural employees was estimated at 11 hours, while the building trades averaged about 10 hours. Wages in 1820 which ranged from 75 cents to $1.25 a day for common labor, depending upon the locality and season, were from $1 to $1.25 a day in 1850. Wages of more skilled artisans and mechanics in the cities similarly advanced from $1.25 and $1.50 a day in 1820 to between $1.50 and $2 or more by 1860.

Emergence of National Unions

The armed conflict between the Northern and Southern States (1861-65) required large quantities of munitions and other factory goods. Prices rose, profits were large, and many new industries were started during this period of civil war. New railroads brought the country closer together. Factory goods from Massachusetts, New York and other Eastern States were shipped by rail to the West. Other factories were built in the cities emerging along the Great Lakes and down the Mississippi Valley.

Unions sought to organize the skilled workers employed by these new enterprises. In 1863 there were approximately 80 local unions in 20 Northern States. By 1864 these States had almost 300 local unions. City centrals (local federations) followed soon after the organization of local unions. A short-lived effort toward a country-wide labor federation was made in 1864 when several of these city centrals established the International Industrial Assembly of North America. National and international unions[1] developed more slowly but steadily year by year, with 13 appearing between 1861 and 1865. The unions formed in these years became relatively strong and permanent organizations which in a few cases (the plasterers, cigar makers, bricklayers and masons) have continued to the present day.

The 15 years following the Civil War was an important formative period for the American labor movement. During 2 cycles of economic recession and revival, the period saw the rise of 14 new national unions. Union membership rose to 300,000 by 1872, and then dropped to 50,000 by 1878. Three unsuccessful attempts were made to unite the various craft organizations into national labor federations. This period also marked the rise of the 8-hour-day movement and the first signs of the long, bitter, and sometimes violent industrial warfare which characterized the struggle of American unionism for recognition and survival.

Establishment of the National Labor Union in Baltimore in 1866 was a response to a growing demand for unification of labor groups throughout the country. Basically a loose federation of city centrals, it included also national and local unions and various social reform organizations. Although one of the purposes of its founders had been to encourage industrial peace through the promotion of collective bargaining, the National

[1] Unions first called themselves "internationals" when some of the affiliated locals were outside the United States, usually in Canada. Today, the terms "national unions" and "international unions" are used interchangeably.

Labor Union soon veered from "pure" trade-unionism. After first concentrating on the 8-hour-day movement, it later tried to stimulate a revival of labor interest in producers' cooperatives.

The driving personality behind the NLU was William H. Sylvis, of the molders' union, who believed in cooperation as a means of freeing workers from the "control" of capitalism. The example of cooperative production undertaken by Sylvis' own union was followed on a limited scale by others, such as the bakers, shipwrights, machinists, tailors, and printers. Because such cooperative enterprise required capital and credit, the National Labor Union was prompted to support the various politically inclined farm groups in the "Greenback" movement which favored large issues of paper money and easy credit at low interest rates.

The year 1872 saw the end of the National Labor Union after its brief and rapid evolution from trade-unionism to a body which sponsored cooperatives and supported political groups. The National Reform and Labor Party, which it sponsored in 1872, failed to survive even one election, and by the end of the seventies few of its cooperatives remained.

However, the emphasis which the NLU had placed on State and Federal legislation had borne some fruit. In 1868, Congress established an 8-hour day for Federal employees, although the struggle still continued in industry. A Government bureau of labor, which had been advocated by the NLU, was provided by law in 1884. Originally named the United States Bureau of Labor, this Federal agency evolved into the present Bureau of Labor Statistics of the United States Department of Labor.

Industrial Strife

In 1873 and again in 1876 several of the leading craft unions attempted unsuccessfully to revive interest in a federation based on a strictly trade-union program. Trade-union membership, meanwhile, was being seriously reduced by a new economic depression. Industrial workers were involved in a series of violent strikes and lock-outs which their organizations were financially too weak to endure. The cigar makers, textile workers, iron-workers, coal miners, and others fought bitterly against wage reductions.

In 1877 the railroad strikes, which originated in Pittsburgh but spread throughout the country, brought in their wake riots, martial law, intervention of State and Federal troops, and some fatalities. A notorious secret association, known as the "Molly Maguires," gained control of lodges of the Ancient Order of Hibernians in the anthracite regions of Pennsylvania. The product of the distress and poverty of this period, the "Molly Maguires" used terroristic methods against employers and strikebreakers. This group was finally broken up by State authorities with the arrest and conviction of several ringleaders who were charged with a series of murders.

Despite the failure of workers to win their immediate objectives, this turbulent period brought a growing recognition of the Nation-wide significance of the labor movement and of the social and economic ills which it was attempting to remedy. Prof. Selig Perlman observed that the experience of these years "nationalized" the labor movement, developing within it a consciousness of solidarity and common purpose. For the first time, also, unskilled workers—on the railroads, in the mines, in the textile mills—played a significant role in industrial conflict and the organized labor movement was no longer identified exclusively with the skilled groups.

Improvement in economic conditions was accompanied once more by the appearance of new locals of skilled workers and the formation of new city centrals, few of the old having survived the depression. Some 18 national unions had survived; 9 others were soon established. By 1885, total union membership again reached the 300,000 level in spite of the economic recession beginning in 1883 which had brought on a wave of strikes against wage reductions.

During the union-employer struggle of this decade the labor movement itself became the scene of a decisive contest over its future structure. The issue was whether a Nation-wide organization of labor should be based upon the direct affiliation of local unions and city centrals cutting across trade lines, or whether a national federation should be based primarily on existing trade or craft unions. The former approach, which had already been tried unsuccessfully several times, was championed by the Knights of Labor, while the latter was favored by the American Federation of Labor.

[TO BE CONTINUED]

Fit Para Booths for Stereo

Special provisions will be added to the projection rooms of the Paramount theatres in Los Angeles and Hollywood to permit inexpensive operation of a three-dimensional feature planned to open in both houses about the middle of October. The process requires simultaneous operation of two projectors, and a total of four projectors would therefore be needed if changeover were carried out in the normal manner. To eliminate this cost, the two existing projectors will be fitted with 5,000-foot reels, permitting continuous operation for more than 40 minutes, and the 90 minute feature will thus be shown with only one interruption "while the operator changes reels." The audience will wear polaroid spectacles.

Bausch & Lomb Welcomes Inventive Ideas

Following is a condensation of the booklet: "Bausch & Lomb Policy Covering the Consideration of Inventions and Ideas." Interested readers can obtain the complete booklet free from Patent Bureau, Bausch & Lomb Optical Company, Rochester 2, N. Y. The gist of it is reproduced here.

THE Bausch & Lomb Optical Company welcomes the opportunity of receiving and examining suggestions and inventions developed by inventors outside of its organization. It is desirable, however, that the disclosure of such suggestions and inventions be made in a formal manner so that they may be considered in a fair and friendly spirit, while still affording mutual protection to all parties.

Our own engineering department is continuously working on the development of new devices and instruments in the optical field and many inventions in that field are also submitted to us by persons outside our organization. If an inventor submits to a concern an idea which has previously been worked out by its own engineers but has not been commercialized, it is conceivable that he might doubt the integrity of the concern if it informed him that it had previously worked out the invention which he had submitted. For the mutual protection of all parties, we have, therefore, adopted the procedure outlined herein.

We wish to emphasize that it is our desire that an inventor fully protect his idea to his own satisfaction before submitting it for our consideration. Hence, we prefer that an inventor either file an application for patent or obtain a patent on his idea before submitting it to us. We realize that this is not always possible or feasible and, if such is the case, we suggest that the inventor make a written disclosure of his invention in duplicate, sign and date both duplicates, and also have them signed and dated by one or more persons to whom he has explained it. One of the duplicates can then be submitted to us.

Such a written description does not of itself afford patent protection, but it would be of use in proving priority of invention should the occasion arise. There is much less chance for misunderstanding and controversy if it is clearly understood that any rights which the inventor may have are only such as may be subject to exclusive ownership under the patent laws.

If an inventor desires to submit an idea, the preferred procedure is to send us a written disclosure in accordance with the above-mentioned terms. If the written description and sketches are clear and ample, models are not necessary, though at times they are helpful in supplementing the written disclosure and, if sent, will be returned to the inventor.

Sometimes a person may have an idea or suggestion which, while having some merit, would not be patentable. Such ideas would generally have only a very nominal, if any, value, since they could be copied freely by competitors. Similarly, advertising schemes, slogans, and business methods probably could be used in substantially the same form by competitors. We will consider such suggestions and ideas only with the understanding that we are to appraise their value and decide what, if any, compensation is to be paid.

To such ideas and suggestions as may be submitted under the conditions outlined herein we will endeavor to accord the fair treatment which has always characterized our relations with others.

IA-IP Ham Radio Bulletins

(*Continued from page* 22)

a simple course. However there is a small charge for these and they must be obtained directly from the ARRL-Hartford, Conn.

We are quite enthusiastic about this because so many of our IA men have always fooled around with radio, even in the old days when a lot of us built the first sets. So the bug is probably still alive in a lot of us who have always wanted to get on the air and either rag chew or work DX. Here is the chance, let's take advantage of it; in any case the course cannot help but polish up a lot we already know and even help us in our own craft. Send me a card if you want the full dope; you will get a prompt reply.

Here and There: W6 Peter Fuzzy Fuzzy kid Champlain of Local 150 (Los Angeles) still insists he is going to be top man in the ALL TIME HIGH Worked IA men. Tch . . . tch . . . so does W6MU Barney of Local 695 (Los Angeles SST). not to even mention Don, W4PKT of 507 (Macon, Ga.) and a couple of our VE Brothers like VE7ALW of Local 348 and that VE3. Many of you already know Jim Evans of Local 242 (Pittsburgh,

Kans.), well he kicked through with a stack of new ones this month which puts him awfully close to that Gold Award, good luck Jim. Ed McMurray W7GXN of Local 180 (Everett, Wash.) is special secretary in charge of keeping us posted on the IA Brothers' calls and activities in his own Local, FB Ed.

We had a personal visit from BA Chet Lamont W7ALM Local 446 (Astoria, Ore.) the other day. Man oh man is he a BIG guy! His ten meter mobile rig really perks. We sez "Chet we will work you all the way home back to Oregon." Last words, my own rig blew up five minutes later—HI!

W7IIJ very active on the air. Don Johnson of Local 401 (Centralia, Wash.) is now W6LYD and is working in 409's jurisdiction, his mobile 75 and fixed station with (?) watts gives this chap W6BAA a run for his money.

Biggest cry this month is "What are the Prizes" for the boys who work the most IA men this year? Well, gang, the deal is simple and at this time I can only say that the prizes are shaping up to be pretty darn good ones. They will be announced in IP in an early issue. One advance tip we can pass on is this, work as many IA men as possible this year, send your totals in by December 15th and you may be surprised. There will be *several* dandy prizes which by popular demand will be radio ham equipment. But don't confuse them with our regular permanent "Worked 10 IA-IP" achievement awards or the "Worked 25" Gold Award.

The IA-IP Amateur Radio Achievement Award Box Score appears this month, so keep plugging and your call will be there too. This was vacation month for many of us and we have several logs to check that appear eligible for the awards but the Ed's deadline won't allow time to get them added to the Box Score until next issue.

We would like to mention, and with a lot of pride, that not one phoney log has been submitted to date.

The honor system is working FB and it just goes to prove that the boys are square shooters and a heck of a lot of fun to rag chew with, but can they gripe!

TV vs third dimensional pics is a topic on the air lately as to which would be better for theaters—well, what do you think? As for myself I'll swap ideas on a practical 3D projection method with any of you that are interested.

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NEW IA-IP 'HAM' LISTINGS

W6HOV	Myron Theon	L. 728
W5BOP	Jim Belote	L. 668
W6FMG	Fred Kionle	L. 165

HEART OF THE PROJECTOR MECHANISM

(*Continued from page* 10)

fact that the pin-cross intermittent acts more quickly than the conventional geneva movement, there is no additional noise from the film loops. The truth of the matter is that the housing of enclosed mechanisms acts like a resonator, or sound-box, *when the mechanism door is open.* With the door closed to confine the inevitable variations in air-pressure caused by all sources of noise, the enclosed mechanism is as quiet as any other. It is interesting to note that the Ernemann German projector, an open mechanism, is amazingly quiet in operation.

The Pin-Cross Movement

Figure 5 shows the Power's cam-ring, and the pin-cross together with its shaft and intermittent sprocket. Note that the four pins of the pin-cross are so spaced that they fit snugly over the cam-ring which holds the cross motionless for the at-rest period of the intermittent. The cam-ring, however, revolves at a constant speed, making one revolution for each pulldown of the pin-cross and its sprocket-shaft.

The diamond-shaped interruption in the cam-ring holds the secret of the intermittent action. This diamond is of such shape that it gives the pin-cross a 90-degree twist as it passes by. The moment the twist is accomplished, the perfectly circular part of the ring again engages the four roller-pins, holding the cross stationary until the diamond comes around again to impart another quarter turn to the pin-cross and sprocket. (See Fig. 6).

The open grooves separating the diamond from the circular part of the ring provide an unobstructed path for the pins while the cross is turning. The entire movement is packed in grease.

The pins of the Power's 6B were roller-pins. These were far superior to the older non-revolving pins which wore flats and caused the picture to jiggle because of the resulting backlash between the pin-cross and the cam-ring. The roller-pin Power's movement was extremely steady and much easier to adjust and service than the conventional geneva movement.

The pin-cross movement provides rates of acceleration and deceleration of the film pulldown similar to those of the geneva movement—that is, the intermittent sprocket starts turning very slowly, gradually picking up velocity until the middle of the pulldown, when the velocity decreases until the sprocket very slowly comes to rest. The ratio of rest to pulldown times can be changed by simply changing the diameter of the cam-ring —the bigger the ring, the greater the ratio.

Figure 6 shows the pin-cross intermittent in action. Follow the stages of action by noting the positions assumed by the pin which is shown in black (for easy identification).

[TO BE CONTINUED]

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I A T S E 173

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CHARTERED
NOVEMBER 17TH. 1909

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May 6th, 1952.

International Projector Corp.,
Bloomsfield, N. J.,
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Gentlemen:-

Having had experience with different makes of motion picture projectors for thirty-three years in Famous Players Canadian Corporation theatres, I find that the Simplex X-L projectors and X-L sound heads which were installed in Shea's Theatre, Toronto, in October 1950, are the finest and most dependable ever made.

Since the time of installation to the present (working in a grind house), no replacement parts have been necessary.

The Spray-O-Matic lubrication insures the complete oiling of all working parts, thus eliminating the danger of wear, due to lack of oil. The large window on the gear side, enables the projectionist, at anytime, to observe the lubrication of the mechanism. Also, no oil can reach the film.

The framing aperture, along with the intermittent frame lock indicator, if properly used, guarantee no "out of frame" on changeovers.

Simplicity of gear train, roominess on both operating and non-operating sides of the mechanism, the twenty-four tooth sprockets, removable gate and film trap, have all contributed in making this projector the most outstanding product in the motion picture field.

For better projection and faithful reproduction, you cannot beat Simplex X-L projectors and X-L sound heads.

Yours sincerely,
James Sturgess

JS:db

J. STURGESS.
President, Local 173.
Motion Picture Projectionists.

103

Simplex X-L

PROJECTION AND SOUND SYSTEMS

INTERNATIONAL PROJECTIONIST

SEPTEMBER 1952

VOLUME 27 • NUMBER 9

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With Which Is Combined PROJECTION ENGINEERING

AARON NADELL, *Editor*

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MONTHLY CHAT

AMONG important matters considered by the recent 41st IA Convention at Minneapolis was the government's latest anti-trust suit against leading picture producers and exhibitors. The Convention agreed that this assault by the Department of Justice should be opposed, and by resolution authorized the General Office to take "such action as it may deem necessary and appropriate to cope with the situation."

Thus Labor, carrying its full weight as one of the major partners in the industry, joins with producers and exhibitors in a common cause.

The Justice Department claims that producers are guilty of "restraint of trade" when they limit their willingness to lease 16-mm versions of top features to Tv stations; or to schools, churches, merchants, and others that use movies to attract attendance but have independent means of revenue and therefore show the pictures at low admission or none.

Producer and exhibitor circles are putting up the strongest kind of opposition to this legal action. Many go so far as to assert that if it succeeds it will force all theatres to close. They also point out that Tv and other free or low-price exhibitors of motion pictures cannot possibly repay the cost of making a feature attraction—only theatre-goers can—; that if theatres are forced to close down feature pictures simply will not be made and no one will get them. The daily press in many cities has taken up the fight on behalf of the theatre and against Tv, and has contributed some strong editorial condemnation of the government's action.

The Department of Justice apparently concedes that theatres are entitled to first showing and suitable clearance before 16-mm versions of their stock in trade are shown free or at low price by others, but contends that such clearance must not unreasonably restrain competition in the exhibition of motion pictures, and that up to now such has been the case.

This will be one of those legal tussels in which the learned and honorable judges are going to have to pull the answer out of their hats. No answers can be found in a law that was written when there was no Tv nor 16-mm, and motion pictures were hardly more than a nickelodeon novelty. The judges are asked to decide what Congress intended the law to mean. The plain fact is that Congress didn't intend anything with respect to these matters because two of them had no existence and the third had no importance.

A new Attorney General might, of course, decide to drop the case. If he does not, it will drag through the courts for many a weary year. Whatever the courts may decide, Congress can overrule them if it wants to. And Labor in this industry will do its full share in cooperation with other elements to secure a favorable outcome.

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INTERNATIONAL PROJECTIONIST

VOLUME XXVII SEPTEMBER 1952 NUMBER 9

Heart of the Projector Mechanism

PART III

By ROBERT A. MITCHELL

THE advantages of a correctly accelerated and decelerated 5:1 intermittent are obvious when we remember that the shutter is an integral part of the system. The shutter used in conjunction with the conventional 3:1 movement transmits, at most, only one-half of the light, the other half being wasted on its blades. If we narrow the blades to let more light through, we get either travel-ghost or a trembling effect in the image which annoys patrons seated close to the screen. Besides, in order to get a *perceptible* increase in picture brightness, 10 or 15% of the total included angle of the shutterblades must be trimmed off. This is definitely out of the question. For the best quality projection, shutter blades ought to be a trifle too wide instead of a trifle too narrow. In no case should the angular width of each blade be less than 90° when conventional 3:1 geneva intermittents are employed. This blade-width results in a light-transmission of 50%.

5:1 Ratio Movements

If, however, a 5:1 intermittent be used in the projector, we have a choice of two shutter designs, each possessing its own peculiar advantages. Figure 7 illustrates these two shutters (labelled "Brilliant" and "Flickerless") together with the conventional type for 3:1 movements.

Each of the three shutters illustrated is meant to revolve exactly once for each cycle of the intermittent. Thus each shutter will revolve 24 times every second.

The main point to be grasped is that the Brilliant and Flickerless shutters *cannot* be used with ordinary 3:1 intermittents. They are designed for 5:1 intermittents only.

The Brilliant shutter for 5:1 movements is similar to the conventional type except that the blades have been narrowed to an angular width of 60°. The two openings, accordingly, are 120° each, resulting in a light-transmission of slightly more than 66%.

This shutter, although producing exactly the same amount of shutter-flicker as the conventional shutter (48 cycles per second), nevertheless lends itself admirably to drive-ins and other large-screen theatres in which adequate picture-brightness poses a serious problem.

The Flickerless shutter for 5:1 movements, on the other hand, has three 60° blades and three 60° openings. There are thus two balancing cutoff blades instead of one. Although the light-transmission is 50%, the same as that of the conventional shutter, the light-cutoffs occur at the rate of 72, instead of 48, every second. Since 72 cycles per second is a frequency too high to be visible even when the picture is intensely bright, the Flickerless shutter is ideal for medium-size and small theatres having very high levels of screen brightness.

While the pin-cross movement furnishes an excellent 5:1 intermittent having the desired acceleration-deceleration characteristics, other 5:1 intermittents can be devised.

For example, a simple 5:1 geneva movement can be designed. Figure 8 shows the plan of such a movement. Tangential entrance of the cam-pin into the star-wheel slot to avoid bumping before acceleration has properly begun is accomplished by the use of a 3-slotted star. The cam must accordingly be made much larger than the star.

There are two disadvantages inherent in this 5:1 geneva movement, however. The first is the close proximity of the cam-pin to the axis of the star-wheel shaft at the time of greatest pulldown speed. This disadvantage could be overcome by making the cam and star very large; but the size of the movement might prove impractical.

Size of Sprocket

The second disadvantage is the need for a 12-tooth sprocket as the intermittent sprocket. The small size of this sprocket relative to the standard 16-tooth and larger sizes may be seen in Figure 9. With a 12-tooth intermittent sprocket, wear on the sprocket-holes of the film might be excessive. The use of reduction gearing between the star-wheel and the intermittent sprocket in order that a larger sprocket be used does not seem feasible.

So much for a *direct* 5:1 geneva intermittent. Now the ordinary geneva movement can be converted into a 5:1 movement either by the use of levers (Edison's method) or by the use of elliptical gears for periodic acceleration and deceleration of the cam-wheel.

In the latter method, the intermittent flywheel is attached to the shaft of the constant-speed (driving) elliptical gear, and the cam-wheel to the shaft of the variable-speed mating (driven) elliptical gear. In operation the cam revolves most slowly during the middle of the at-rest period of the star and sprocket, and most rapidly during the pulldown period.

This system works very satisfactorily —so well, in fact, that we fail to understand why it has not been adopted by the

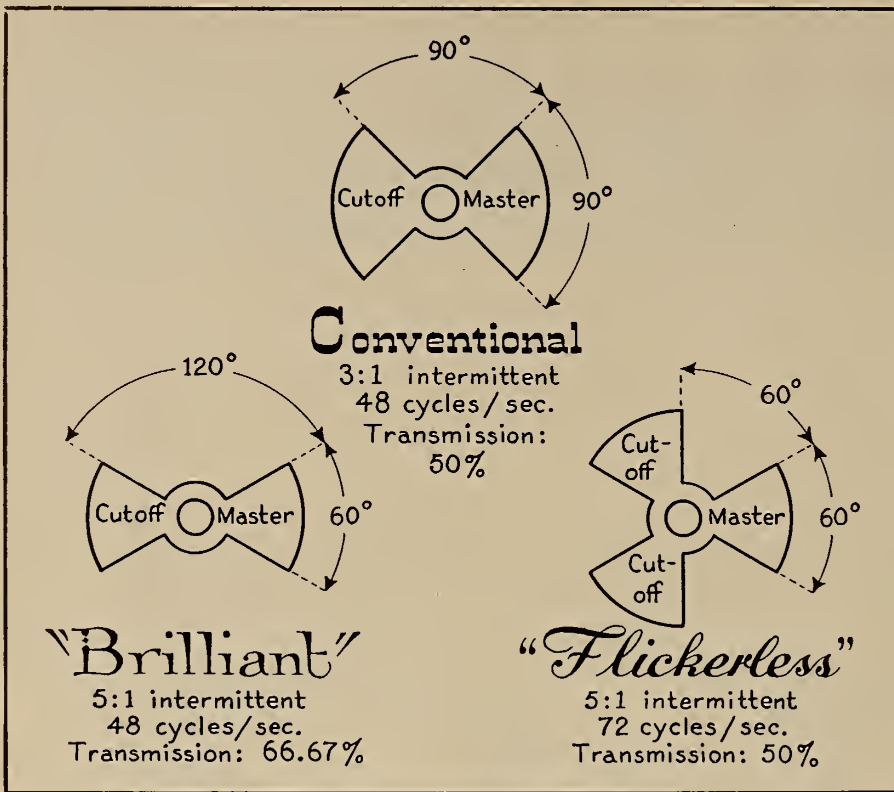


FIG. 7. The two-fold advantage in shutters which can be used with 5-to-1 intermittent movements. The "Brilliant" shutter has the same periodicity as the conventional shutter—48 cycles per second—but transmits much more light to the screen, making the picture brighter. The "Flickerless" shutter transmits the same amount of light as the conventional one, but its high frequency—72 cycles per second—frees pictures projected at high light levels from annoying shutter-flicker evident with intense light at 48 cps.

well-known projector manufacturer who has tested it exhaustively.

A fourth type of 5:1 intermittent, shown in Figure 10, is the "screw-shift" movement—also called the "variable ratio" movement because the ratio can be changed by merely changing the flange-wheel to one having the same diameter but a different plowshare pitch. It is manufactured by Lytax in Germany. The size of the intermittent sprocket is governed solely by the number of radial slots in the slot-wheel.

The plowshare protuberance brings about the pull-down shift of the intermittent sprocket. Consider the flywheel in Figure 10 to revolve in a clockwise direction as viewed from the top. The flange slides through one of the slot-wheel slots to hold the intermittent sprocket at rest most of the time. But when the plowshare-screw comes along, the slot-wheel and sprocket begin to move, rapidly accelerating until the plowshare is halfway through the slot. Movement continues, but at a decelerating rate until the point of the plowshare is in the slot. As the plowshare disengages, the flange enters the next slot, locking slot-wheel and sprocket.

A friendly argument now substantially settled arose on this side the Atlantic—the battle of the soft *versus* the hardened intermittent sprocket. It was formerly imagined that hardening causes under-cutting in the form of a notch in the metal at the base of the sprocket teeth, and that teeth not hardened wear off smoothly. Experience has failed to support these opinions.

As a matter of fact, the teeth of the old-style 0.935-inch in diameter 16-tooth intermittent sprocket got notched at the base whether soft or hardened. It was supposed by some that the hardening did not extend all the way through the teeth. In that case rapid notching might occur after the hardened surface layers of metal had worn off. But the microphotograph of hardened intermittent-sprocket teeth on p. 78 of "The Sound Track Book of the Theatre" (Motiograph, Chicago) proves conclusively that the hardening penetrates the tooth completely.

In the opinion of Motiograph engineers, the hardened steel intermittent sprocket outlasts the soft sprocket many times over, and suffers no undue notching at the base of the teeth. So sure is this opinion, that all Motiograph projectors, including the modern AA, are furnished with hardened intermittent sprockets. Simplex does the same in the E-7 and X-L projectors.

The teeth of new-style 16-tooth intermittent sprockets, 0.943 of an inch in diameter, have a tendency to wear off smoothly, with less notching, than the teeth of the old 0.935-inch sprockets. This characteristic has nothing to do with the hardness of the teeth.

Intermittent Sprockets

In the opinion of some projectionists and manufacturers, the new-style standard sprocket was made too big. Instead of 0.943 inch, they say, the new-size sprocket should be 0.940 of an inch in diameter, since shrunken film—and this includes all film that has been run a few times—does not take kindly to sprockets having too great a tooth-pitch. Alleged "improved" and unimproved prints must still run on the same projector.

The even larger 0.945-inch sprocket recommended in 1930 (American Standard Z22.35) was ultimately rejected because of its noise, rapid wear of the teeth, and damage inflicted on the film perforations. The size of this sprocket made no allowance whatever for film shrinkage—that is, it was suitable only for film-stock having a shrinkage of 0%. Z22.35-1930 has, therefore, been modified, and as Z22.35-1947 now specifies an 0.943-inch sprocket.

Film can lose as much as 1.8% of its length through shrinkage in extreme cases. To accommodate a film shrunk to this extent, an 0.929-inch sprocket is required to avoid sticking of the film to the sprocket teeth, with severe tearing when the sprocket-holes disengage. With present-day stock, however, shrinkage in excess of 1% is rare. For this degree

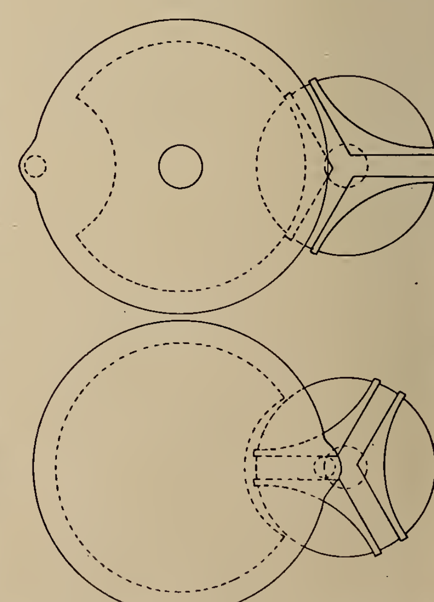
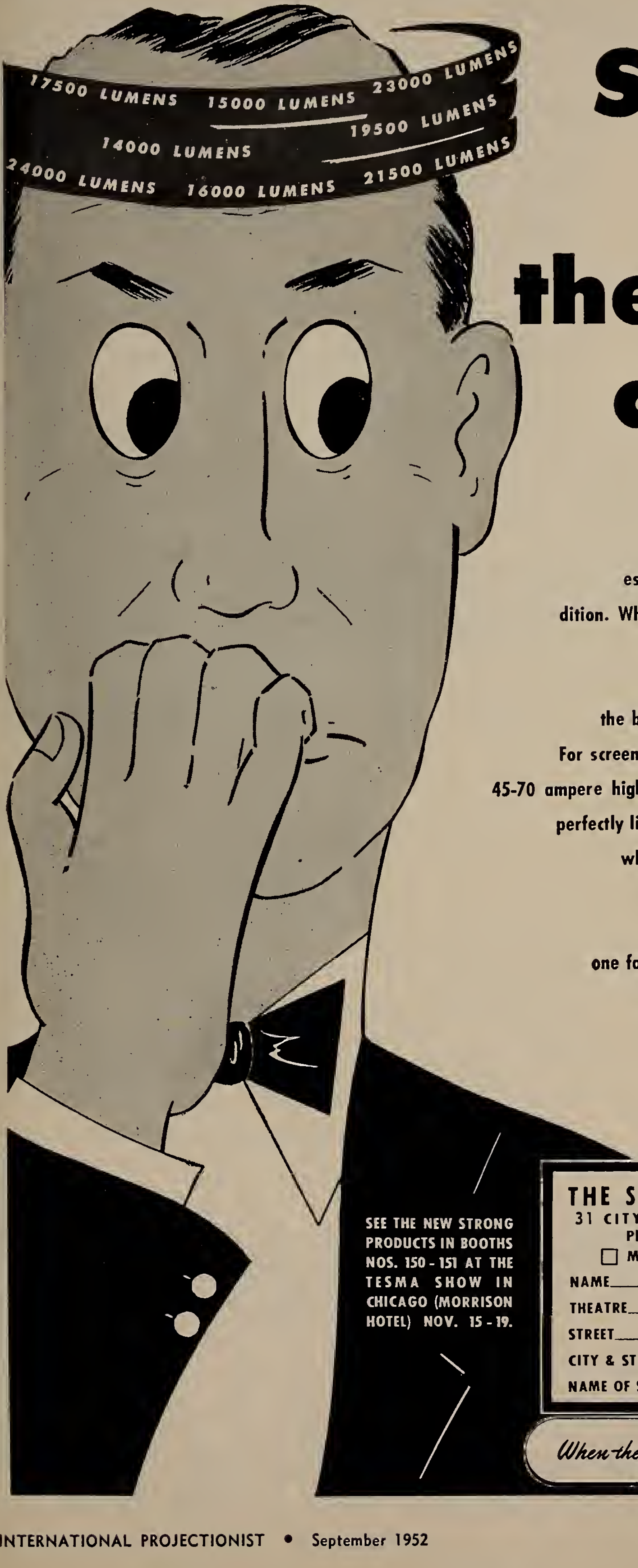


FIG. 8. A geneva type 5-to-1 movement. This intermittent is workable, but has two disadvantages—terrific leverage during pulldown and the necessity for using a small 12-tooth intermittent sprocket which might damage sprocket-holes.



Strong ends the lumen confusion

by offering a line of projection arc lamps especially designed for finest results under every condition. When buying lamps you can eliminate guesswork and avoid headaches by seeing a Strong dealer. If your screen width is more than 24 feet he has the big Strong 75-130 ampere high intensity Mighty "90." For screen widths from 21 to 24 feet he'll show you the Strong 45-70 ampere high intensity Mogul. Screens 19 or 20 feet wide can be perfectly lighted by the Strong 46 ampere high intensity Utility, while screens 18 feet wide or under call for the Strong one-kilowatt 40 ampere high intensity Utility. As the only lamps produced complete within one factory, Strong lamps can be engineered to obtain the highest efficiencies ever attained. That's why more dealers sell, and more theatres buy Strong-made lamps than any other make.

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NAME______
THEATRE______
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NAME OF SUPPLIER______

When the lamps are ***STRONG*** *the picture is bright!*

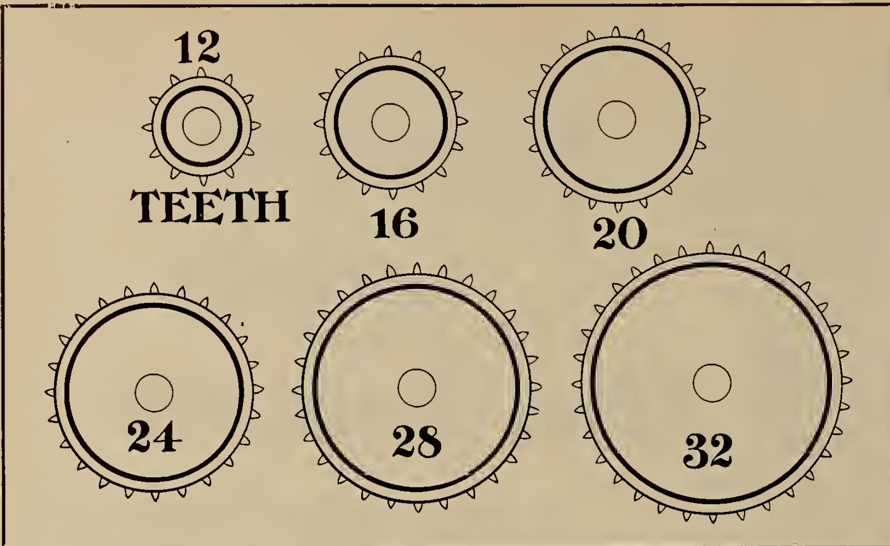


FIG. 9. Comparison of the relative sizes of various 35-mm sprockets. The 16-tooth sprocket is now standard for intermittents, and is also commonly used as a feed and sound sprocket in most American equipment. The 24-tooth sprocket is used for upper and lower feeds in the Simplex X-L. The 32-tooth sprocket is common in many soundheads, in motion picture cameras, and as the feed and holdback sprockets in most European projectors.

of shrinkage, an 0.937-inch sprocket meshes perfectly. Time will tell whether triacetate safety stock shrinks more and faster than nitrate stock of good quality, or vice versa.

An 0.940-inch sprocket, however, works perfectly with film shrinkages up to 0.8%, which seems a bit closer to down-to-earth reality than larger sprockets. The old 0.935-inch sprocket accommodated shrinkages up to 1.2%—unnecessary in these days when runs in neighborhood houses are "hotter" than they used to be.

Picture Jump and Gate Tension

Even though film rarely or for long possesses that precise degree of shrinkage which results in perfect mesh of the perforations with the sprocket teeth, the use of 25- and 32-tooth feed and holdback sprockets has demonstrated conclusively that the larger sprockets are kinder to the perforations. A quarter film-wrap on a 16-tooth sprocket brings 4 teeth on each side into play. The same wrap of film on a 24-tooth sprocket brings 6 teeth into play.

Definite advantages may be claimed for the 24-tooth intermittent sprocket. Tests indicate that increased perforation damage is not appreciable below intermittent ratios of 7:1 or 8:1 with 35-mm film running at 90 feet per minute. And whatever increase in wear may occur at high ratios is due, not so much to the rapidity of the pulldowns, as to the increased gate tension needed to prevent overshooting. With ratios of 5:1 or 6:1 gate tension need be set only slightly higher than is customary with 3:1 intermittents.

As previously stated, the parts of all American geneva movements are manufactured to a tolerance of 0.0001 inch. With "perfect" film the picture-jump in the aperture will be less than 0.0005 inch if the intermittent be properly adjusted and gate tension correct. Accordingly, the picture-jump on a screen 20 feet wide will be of the order of ⅛ inch. This is obviously too small to be detected from even the front rows of seats. If a greater degree of picture-jumping prevails, the trouble may be found in worn or maladjusted mechanism parts, improper gate tension, film-loops too large, loose lens mount, unsteady projector support, or in the film itself. The film is very often at fault.

The work performed by the 3:1 geneva movement is exacting. Working at the rate of 24 frame-pulldowns per second, the complete pulldown is performed in 1/96 of a second. Between pulldowns, the sprocket and film remain at rest for 1/32 of a second. While the *average* speed of the film through the gate is 90 feet per minute, the average speed during the pulldown process is 360 feet per minute.

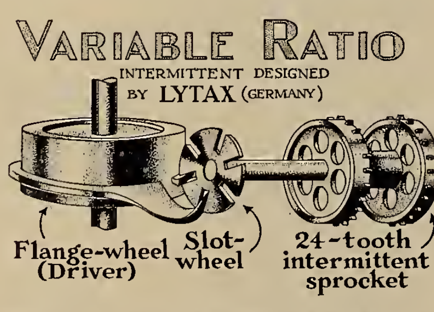


FIG. 10. The screw-shift intermittent, the movement-ratio of which may be varied by changing the plowshare portion of the driving-wheel flange. An eminently satisfactory movement permitting use of 5-to-1 ratio and 24-tooth intermittent sprocket.

Because the film is accelerated and decelerated at increasing rates during the pulldown, the *maximum* film-speed of 860 feet per minute is attained in only 1/192 of a second from the time that the cam-pin enters a star-wheel slot!

And let it not be supposed that film went through the projector more slowly in the days of silent pictures. If the show happened to be running overtime, the projectionist would crank the machine as fast as 120 feet per second, slowing down only during the subtitles so that the audience would have time to read them! (*Normal* silent speed was 16 frames per second, 60 feet of film per minute.)

With these facts in mind, we can easily see that excessive gate tension will cause the sprocket-holes of the film to check and tear, especially at their corners. But if not enough tension is applied, the film will overshoot, making the picture look as though it had been photographed during a violent earthquake. There is absolutely nothing except the slight friction offered by the face of the intermittent sprocket plus gate tension to hold the film in place when the sprocket stops turning.

Our nickelodeon projectionist who cranked his Power's at top speed often had to press against the film with his fingers to prevent overshooting.

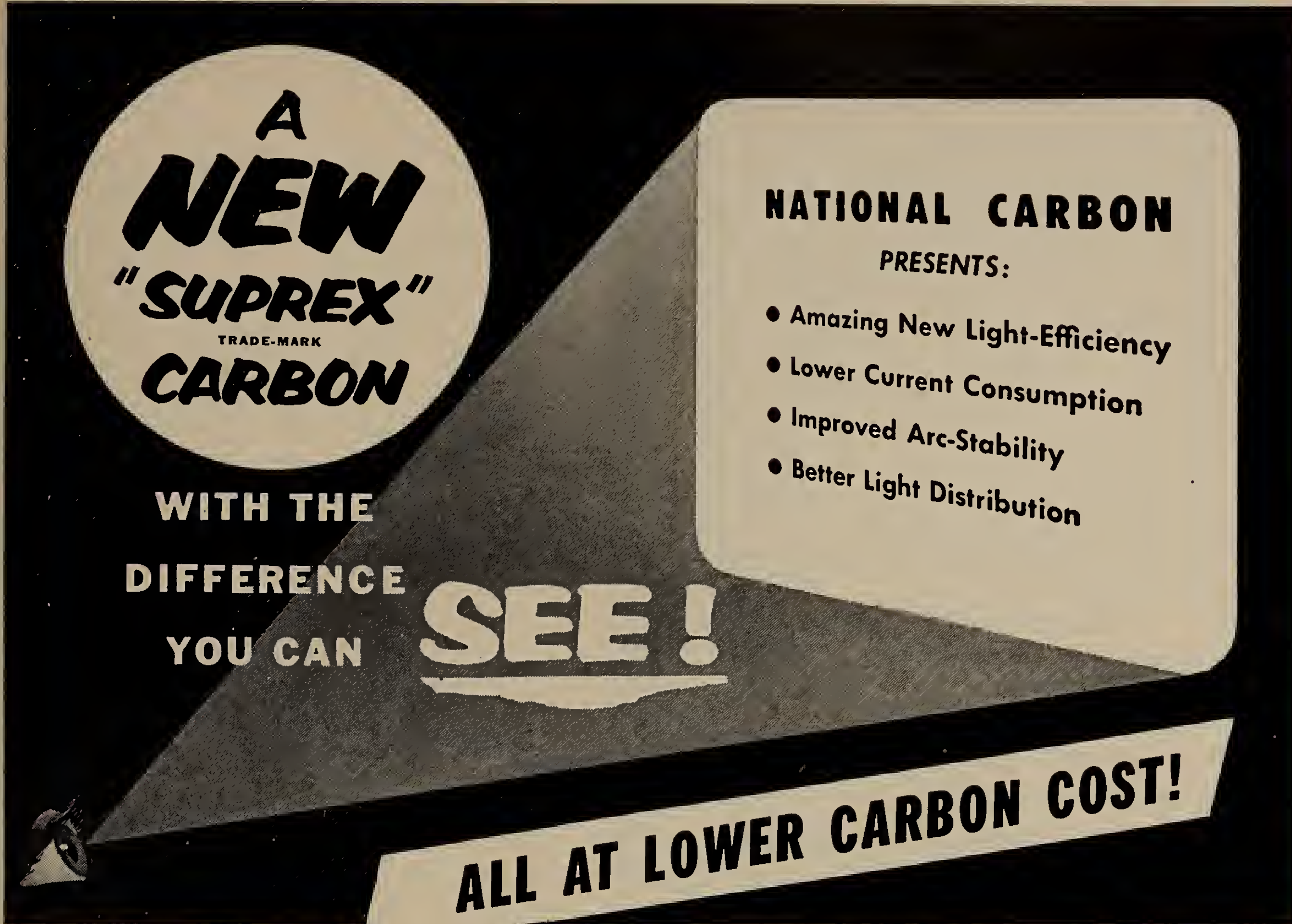
Overshooting seldom bothers us today except in the case of "green" (brand-new) prints which have not been properly lacquered or waxed for their first run. Overshooting from this cause may be eliminated by (1) very high gate tension (which may ruin the film); (2) low gate tension (which will minimize the "sticking"), or by (3) lubrication of the edges of the film with projector oil (which may oil-spot the print, and fog the lens with oil vaporized by the heat of the gate). In short, there is no satisfactory method open to the projectionist that will enable him to remedy this oversight on the part of the exchange.

Maintenance of Intermittents

It is impossible to give specific instructions for the care and repair of intermittent movements in an article of this nature because it would be necessary to cover all makes and models—and there are more than a few in use. So instead of doing this, we commend to the projectionist the first-hand information given in manufacturers' manuals. These may be obtained by writing to the manufacturers themselves, asking any special questions which may not be covered in general instruction booklets.

However, a few words may not be out of order anent the changing of intermit-

(*Continued on page* 34)



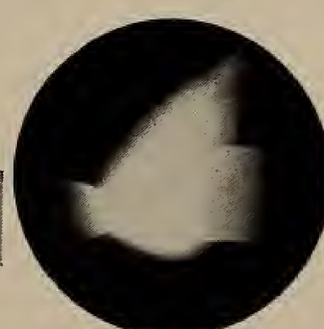
Not just claims but VISIBLE improvements distinguish the NEW 9 mm "Suprex" projector carbon in any 9-8 mm copper-coated high-intensity trim.

AND THAT'S NOT ALL! With an optimum current range of 65-75 amperes, the new 9 mm "Suprex" carbon and the 8 mm "Orotip" C negative carbon can be substituted directly for the 8 mm-7 mm carbon trim up to 70 amperes*. Merely install appropriate holders and guides in your present equipment and get:

- More light at slightly increased current
- Equal light at same current
- Lower carbon consumption and cost
- Better light distribution at all currents

*Above 70 amperes, see your theatre supply dealer for his equipment recommendations.

BUY WISE—DEMAND TO SEE THE DIFFERENCE!



The terms "Suprex" and "Orotip" are trade-marks of Union Carbide and Carbon Corporation

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Stereosound Enhances Eidophor Tv

EIDOPHOR theatre-size television (IP for July, page 14) is equipped with stereophonic sound, Altec Service Corporation (which cooperated in supplying the equipment) now reveals.

At the Eidophor demonstrations in New York in June the remarkably lifelike quality of sound was apparent to many present, but inquiries on the subject were turned aside by Twentieth Century-Fox officials who naturally wanted to concentrate attention, at that time, on the excellence of the Tv screen image.

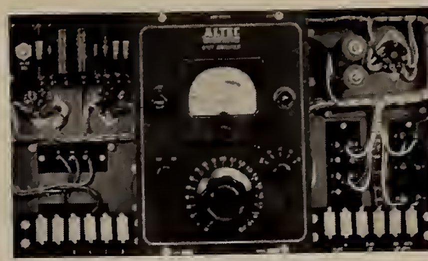
But in fact, as has now been made known, there were three separate sound systems, actuated by three separate sets of microphones and supplying three separate speakers.

Binaural Sound in Small Theatre

A third-dimensional audio impression (as in the original Walt Disney "Fantasia") was not produced, owing to the small physical size of both theatre and studio. The studio offered little room for the players to move about; they were grouped closely together. Further the narrowness of the "Little Theatre" forced the grouping of the three sets of loudspeakers rather close together. For these reasons the effect produced might be described as a binaural rather than a truly three-dimensional output. Binaural sound is, of course, richer and more lifelike than ordinary reproduction because the sounds entering the listener's right and left ear are not identical but vary slightly, as in actual life.

Figure 1 is a schematic presentation of the stereophonic system. It will be noted that there are two separate sets of microphones—three to each set. One reason for this was the L-shaped layout of the studio. The stem of the "L" constituted the stage, with the Tv cameras at the top of the stem. In the base of the "L," off to one side and out of sight of the cameras, were the musicians. Figure 1 diagrams the three microphones that provided stereophonic pickup from the stage, the second set of three that provided stereophonic pickup of the orchestra; and also how the resulting outputs from left stage and left orchestra, center stage and center orchestra, right stage and right orchestra, were mixed and each applied to its appropriate amplifying channel. The resultant audio effect was very much as if the orchestra had been in a pit in front of the stage, and only three microphones used instead of six—but in that event the musicians could not have been so readily hidden from the cameras.

Earl I. Sponable, director of research for Twentieth Century-Fox and G. L. Carrington, president of the Altec companies, planned the stereo sound system several months in advance of the demonstration. Lorin Grignon of the Twentieth Century-Fox West Coast sound department, and F. J. Pfeiff of Altec Service Corporation engineering department, cooperated in supervising the installation. Some of the equipment had been built on the West Coast and was of special design for Twentieth Century Fox's experimental stereophonic film recordings. Altec supplied more standard items, including their 639 microphones, 127 and 425 type amplifiers, matching transformers and type 800 speaker systems. Three specially equalized telephone lines provided the three audio channels between the studio and the theatre two city blocks away.



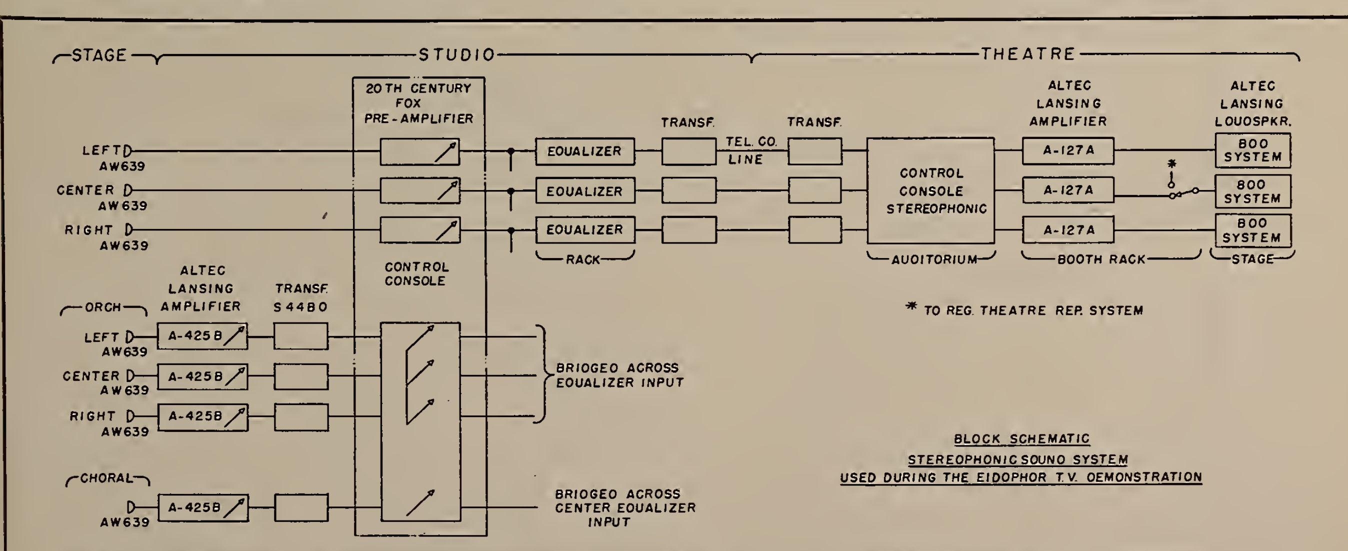
Altec-Lansing A 127 amplifiers were among the equipment items supplied by Altec Service Corp. for use with the Eidophor stereophonic sound system.

Loudspeaker Locations

A part of one of the three sound channels was the regular sound amplifier of the Fox Little Theatre projection room. This amplifier normally operated into an Altec Voice of the Theatre speaker system; that system was removed in favor of the three Altec 800 systems used in the Eidophor demonstration. The right side and left side 800 speakers were located outside the edges of the screen, concealed behind a masking of thin China silk. The central amplifier channel was equalized to compensate for the difference in sound

(*Continued on page* 33)

FIGURE 1



At extreme top left of diagram are shown three AW 639 microphones used for stage pickup; three more (below) for orchestra pickup and one (bottom) for the chorus. The three stage microphones are wired to pre-amplifiers located inside the studio control console; the four others to A-425 B pre-amplifiers and thence through S 448 Q transformers to the same console. Outputs are bridged at equalizer inputs to form three transmission circuits. These in turn are wired through telephone lines and matching transformers to the auditorium control console and thence to their respective power amplifiers and loudspeakers. A switch permits ordinary operation through the center speaker only.

British Plan Four-Year Course in Projection

Elaborate apprentice - instruction program and exemption from draft planned to overcome scarcity of trained, competent projectionists.*

A FOUR-YEAR course of apprenticeship and training for projectionists in Great Britain is currently under consideration by exhibitor circles in that country as a means of counteracting the shortage of trained theatre projectionists.

The elaborate training course was not planned by exhibitors, but by the British Kinematograph Society — the overseas equivalent of the American Society of Motion Picture and Television Engineers. BKS worked out the details in collaboration with the government, the Association of Technical Institutes and the Technical Schools Headmasters' Association. (Government enters into the picture because draft deferment of students is planned.)

Two other organizations intimately concerned are the union—NATKE (National Association of Theatrical and Kinema Employes)—and the employer organization — CEA (Cinematograph Exhibitors Association).

At present the proposal is in the hands of CEA for decision. That organization is reported to favor some kind of project to remedy the current shortage of skilled projectionists. It is wary of this proposal, however, for three reasons.

One is fear that licensing of projectionists may result, and CEA is opposed to licensing because that would limit the supply of available labor. Second, CEA is said to fear that highly trained men will want proportionately high pay, and that they will have acquired the education and ability to go elsewhere if they do not get it. Thirdly, there is the chance that this proposal may eventually lead to a closed shop in the projection field. The union, for its part, is not altogether in favor of the proposal either, but objects to any arrangement that might require NATKE to help non-members.

Under the plan, apprentices would divide their time between the projection room and school, but with most of the time being spent in the projection room. They would be paid 30 shillings a week at the start; then 40 shillings (roughly $6.00 at present rates of exchange), and so on to 70 shillings after completing the course.

The syllabus, as proposed, is as follows:

FIRST YEAR

MATHEMATICS

Arithmetic.—Revision of elementary rules: addition, subtraction, multiplication and division of fractions and decimals. Averages: percentages: square and cube roots: metric system: conversion of units.

Mensuration.—Areas and linear measurements of the rectangle, the triangle and the circle.

Algebra.—A general introduction to symbols: substitution: addition and subtraction: simple equations of the first degree: easy factors and fractions: laws of indices.

Graphs.—Plotting and reading of simple graphs.

ELEMENTARY PHYSICS

Heat as a form of energy: difference between temperature and heat: thermometers: Fahrenheit and Centigrade temperature scales: units of heat: expansion and contraction due to changes in temperature. Laws of radiation, propagation and reflection of light: plane mirrors: curved reflectors: condensers: simple lenses: illumination: brightness, reflection factor. Force: work, energy power. Laws of motion: velocity and acceleration.

Treatment of the syllabus should include the appropriate laboratory work.

ELECTRICAL ENGINEERING

Theoretical Work. — Elementary concept of electrical charge and EMF, electrical currents, practical units (ampere, volt and ohm). Ohm's Law: potential fall in circuits: potential difference: series, parallel, and series-parallel circuits. Heating effect of the current and simple applications. Electrical work and power, and relationship of units (joule, watt, horsepower, kw. hr. and BTU).

Elementary magnetism: permanent magnets: electro magnets: force in a conductor carrying current in a magnetic field. Simple forms of galvanometers: ammeters and voltmeters. Chemical effects of the current; primary and secondary cells.

Laboratory Work. — Experiments designed to teach the meaning of electrical units: determination of Ohm's Law, including connection of resistances, cells, etc., to prove values of series, parallel and series-parallel networks.

Examination of primary and secondary cells, including instruction in their connection, use and maintenance. Experiments to illustrate charging and discharging characteristics of cells.

Projection Engineering. — Standard dimensions of films: standard leaders: rewinding: splicing: changeover dots: care of film: spools: film cabinets.

SECOND YEAR

MATHEMATICS

Revision and extension of the first-year work, including properties of the sine wave: elementary treatment of vectors and rates of change. Mathematics should also provide for the further calculations required in electrical engineering and physics.

PHYSICS

Heat—Heat transmission by radiation, conduction and convection: mechanical equivalent of heat. Types of fuel in general use and calorific values. A description of types of boilers, heating systems, and gauges, as used in kinemas.

Light.—Projection lenses: focus: focal length: image formation: aperture: compound lenses: lens faults and correction.

Sound—Wave motion; wavelength:

*According to Ideal Kinema, London.

Nitrate Fire Shows Its Stuff

What nitrate film fire can do was demonstrated late last month in Atlanta, Georgia, when prints stored in the Kay Film Exchange suddenly blazed. Sheets of pure flame burst through closed windows and shot 50 feet across the street, scattering fragments of glass on the heads and shoulders of firemen. A hailstorm of glass splinters from those windows also showered a nearby parking lot. Acrid fumes following the blasts overcame a number of the firefighters. Although the fire was brought under control in less than half an hour extensive damage was done not only to the film exchange but to a number of nearby business enterprises.


ST CHANCE
BAR
Round-up
Cafe

frequency: amplitude: musical notes, pitch and quality: elementary treatment of microphones and loudspeakers.

ELECTRICAL ENGINEERING

Elementary treatment of and experiments with DC generators and motors, including principal types, construction and control. Further treatment of voltmeters and ammeters (moving coil, moving iron and hot wire) use of multipliers and shunts: the ohmmeter. Types of cable, sizes, capacities: fuses: switchgear and fittings: earthing: simple bell and telephone circuits: symbols: reading of wiring diagrams: testing insulation and continuity. Filament lamps: construction, rating and efficiency. Simple lighting systems and control, including dimmers.

PROJECTION ENGINEERING

Types of film material and cements: making up programmes: film inspection and repair: transmission characteristics: types of sound track: principles of projection: persistence of vision: film path: take-up: fire traps: loops: projection mechanism and drive.

THIRD YEAR

ELECTRICAL ENGINEERING

Elementary concept and experiments to illustrate the principles of alternating voltage and alternating current: frequency: sine wave; mean and RMS values: single-phase supply; simple series and parallel AC circuits with resistances, chokes and condensers: phase displacement, power and power factor, simple polyphase circuits.

Examination of the construction of and the theory of transformers.

Valves (Elementary treatment). —Thermionic emission: the filament: the cathode: saturation: the simple diode: space charge: rectifying action: the triode: grid control: characteristic curves: the tetrode; the pentode; photoelectric cells: valve bases. Ionisation effects in valves.

Rectification (Elementary treatment). —Principles of rectification: the diode rectifier as used for HT supplies: full-wave and half-wave circuits: metal rectifiers: the bridge circuit: mercury vapour rectifiers: hot cathode rectifiers: smoothing circuits.

PROJECTION ENGINEERING

Description of the manufacture of film: principles of photography: positive release prints and treatment: colour film (additive and subtractive). Projection mechanisms: intermittent motion: type of intermittent movements, including detailed examination of principles of shutters and instruction on phasing and adjustments, gates and sprockets and so on.

Demonstration of the causes of film damage: care and maintenance of mechanisms: replacement of worn parts: fault-finding. Examination of and the dismantling and rebuilding of arc lamps: principles of carbon arcs: high and low intensity arcs (DC and AC): effect of voltage and current, including experiments to illustrate arc characteristics: types of control and feeding mechanisms.

FOURTH YEAR

ELECTRICAL ENGINEERING

Principles of and examination of the construction of alternators: single- and 3-phase AC motors (series, capacitor, repulsion-induction, split-phase, shaded pole, squirrel cage, wound rotor): methods of starting, speed control: maintenance: fault-finding and correction.

Electrical installations complying with Statutory Cinematograph Regulations.

Electrical safety lighting systems including floating and trickle-charged installations, types of charging apparatus: care and maintenance of batteries.

Types and application of discharge lamps (cold cathode, fluorescent, neon and projection): auxiliary apparatus: methods of dimming: types of fittings: electric signs and their maintenance: floodlighting.

Electricity tariffs: types of tariff available: selection of the most economic tariff: calculations: reading of meters.

PROJECTION ENGINEERING

Principles of DC arc supplies—motor generator (shunt and compound); output regulation: ballast resistances: rectifiers (3-phase and single-phase input): arc stabilisation by resistance, reactance and resonance control. AC arc supplies: induction, types and efficiencies. Contactor systems and switchboards associated with arc supplies.

Projection Optical System.—Mirror-type arc lamps: types of mirrors: magnification calculations: collection angle: light loss in transmission: arc lamp speed: projection lenses: calculation of focal length: lens apertures: lens calculations: bloomed lenses: importance of a matched optical system: importance of correct alignment.

Screens.—Types of screens (including rear projection): reflection factors: screen frames: masking: screen illumination: foot candle and lumen measurements picture size: correct viewing conditions.

Soundhead and Amplifier.—Principles and construction of the soundhead: photo-electric cells: optical systems: constant speed devices: voltage amplifiers: faders: main amplifiers: tone control: HT supplies: loudspeaker assemblies (HF and LF): energised and permanent magnet types: characteristics: cross-over networks: non-synchronous apparatus: types of pick-up: types and principles of operation of microphones: deaf-aid equipment.

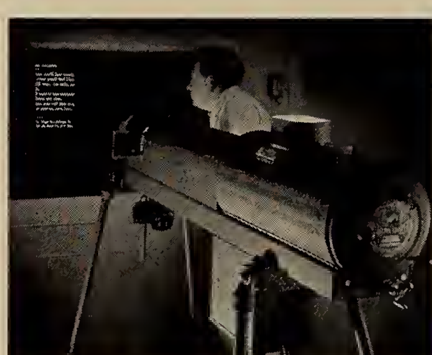
THE KINEMA

Statutory Cinematograph Regulations. —Some effective provision should be made throughout the course to draw

(*Continued on page* 34)

New Strong Slide Projector Uses AC Arc

Built around a 45-ampere AC arc the slide projector pictured below delivers a rated 7500 lumens of light for the projection of still slides with motion picture brilliance, according to its manufacturer, Strong Electric Corp. It can fill a drive-in screen with satisfactory illumination, its maker claims.



New Strong AC arc slide projector, burning 45 amperes, which is rated capable of projecting slides with adequate brilliance even on a large drive-in screen.

The rated illumination of 7500 lumens is, of course, the equivalent in brilliance of twice that figure in motion picture projection, since in slide operation there is no shutter light loss. Absence of a shutter also permits flickerless performance with an AC arc.

The slides are effectively cooled by a 50 cmf blower and can be projected for an hour or more without damage even in the case of dense slides, it is claimed. Slides measuring either 2" x 2", 3¼" x 4", or 4" x 5" can be projected. Carbons, motor-driven, are 6-mm x 7"; and a pair will burn for 80 minutes at 45 amperes, 21 volts. No power source is needed other than a 110-volt AC socket—the equipment is merely plugged in.

The projector is mounted on adjustable legs which permit adjustment to an optical center at any height of from 36" to 55", and any projection angle between 27° downward and 10° upward. Length of the projector barrel is 78". The optical system incorporates a 10¼" glass mirror and three lenses.

Electrical Indicating Instruments*

Voltmeters, Ammeters, Wattmeters—Their Accuracy Depends on Proper Use

By C. C. PETERSEN

WHEN we become familiar with electrical indicating instruments of the common garden variety—and most of us use them at one time or another—we become aware of two significant things: each instrument is an individualist and should be calibrated in order to be trusted; and each of the many operating principles used, in say a voltmeter, has its limitations and its area of advantageous application.

This discussion is limited to portable electrical indicating instruments such as voltmeters, ammeters and wattmeters.

Calibration

Calibration of an electrical indicating instrument implies comparison with a known standard, that is, applying the same voltage, current or power to both the standard and the instrument being calibrated and recording the indications of both instruments. The Ohmite Laboratory of Precision Measurements at the Foundation maintains laboratory standard instruments of the type shown in Fig. 1.

These instruments are equally accurate, ± 0.1%, on direct current or at alternating frequencies up to 1,000 cycles per second. Comparison with these standards is a straightforward matter. The question arises, though, "How do we know they are accurate?"

Calibrating these instruments requires the use of standard electro-chemical cells whose stability has been studied over a period of years and whose present value is known by virtue of frequent comparison with the national standards at the Bureau of Standards in Washington, D. C.

Also required are stable resistors or shunts of known resistance value, likewise periodically compared with the standard ohm in Washington. A cell with a Bureau certificate no older than three months, and resistors of all usual values with certificates no older than one year, are on hand at the Ohmite Laboratory at all times.

The standard cells are inherently less stable than resistors, the voltage being stated to six significant figures but certified to only five figures. Typical drift in one year is approximately 0.002%. Standard resistors have values stated and certified to one part of one million, and are extremely stable. A typical cell, a standard resistor and their certificates are shown in Fig. 2.

These indicating instruments are evaluated with direct current. By virtue of their operating principle and their careful construction they are equally accurate on alternating current frequencies up to 1,000 cps.

The standard indicating instruments, thus established in accuracy, provide a rapid means of calibrating other instruments within their range. Their ranges may be extended by the use of instrument transformers which are certified at the National Bureau of Standards. Often direct current instruments are compared directly against the standard cells and resistors by means of a potentiometer. Calibration at higher frequencies requires thermocouple instruments which may be established at low frequencies and will then be accurate at very high ones.

Classification of Indicating Instruments

Electrical indicating instruments may be classified in several manners. One common classification corresponds to their general usage and correlates to a great degree with accuracy. Laboratory standards, costing in the order of $1,000 apiece and of ± 0.1% accuracy, have already been described. The instruments are provided with leveling devices for maintaining them in a horizontal position and should not ordinarily be moved.

Portable instruments for general use range in accuracy from 0.25% to several per cent and in cost from $200 to $20 approximately. Panel type instruments are compact, inexpensive units for apparatus in which general practice requires numerous panel-mounted instruments of reasonable but not exceptionally high accuracy. Switchboard type instruments are rugged instruments with large, easily read scales and usually have an accuracy of about ± 1%. Fig. 3 shows representative instruments of various classes.

Portable instruments are probably the ones most abused and the type in which more errors in selection are made than in the other types. It is the purpose of the following discussion to provide some help in choosing the proper instrument for a particular application.

FIG. 2. One-ohm standard resistor and standard cell, with National Bureau of Standards certificates.

It is well to know how much accuracy is required in the measurement being made and then to select an instrument compatible with that requirement. It is as inappropriate to use a 0.25% instrument for a measurement requiring an accuracy of ± 10% as it is to use a surgeon's scalpel to dig potatoes, though it is sometimes done in a pinch.

Manufacturers' catalogs describe their instruments and specify accuracies. It will be found that the better instruments have many common features including long scales, preferably with a reflecting surface for reducing parallax in reading the pointer position, sharp or knife-edged pointers, and balance weights to allow the instrument to be used in almost any position, though the horizontal position is the safest.

Other features not so easily discerned are spring-mounted pointer stops to absorb shock, jewel bearings, damping, which may be accomplished by air vanes

*The Frontier, Armour Research Foundation

FIG. 1. Weston Model 326 laboratory standard instruments; accuracy 0.1%.

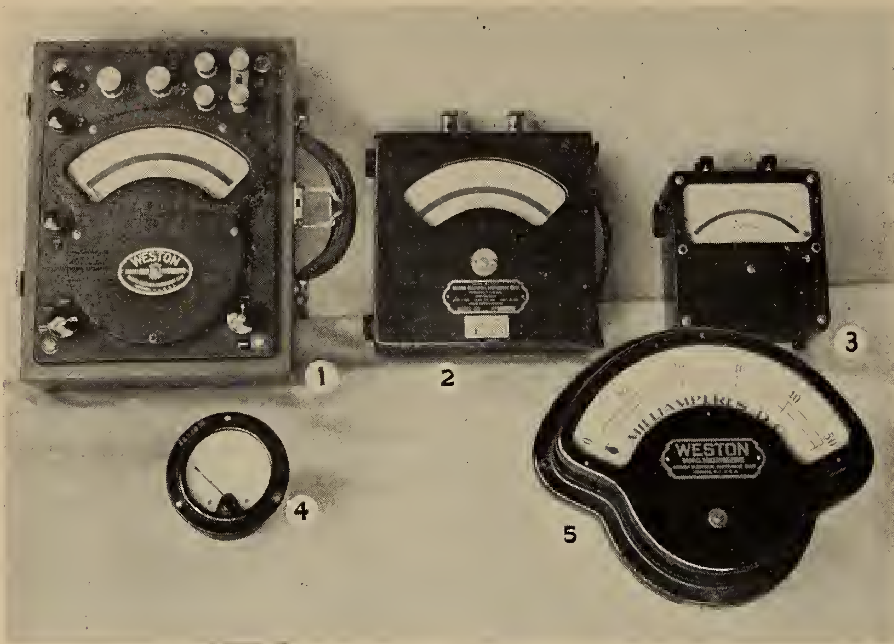


FIG. 3. Typical electrical indicating instruments: (1) electrodynamometer type, 0.25% accuracy, portable; (2) moving iron type, 0.5% accuracy, portable; (3) permanent-magnet-moving-coil type, 0.5% accuracy, portable; (4) moving-iron type, 2% accuracy, panel; (5) permanent-magnet-moving-coil type, 1% accuracy, switchboard.

or by electromagnetic means, and soft iron shielding which provides a path for outside magnetic fields.

The operating principle of an electrical indicating instrument in general determines whether it may be used for direct current or alternating current measurements, and over what frequency range it is suitable. This subject is covered in some detail in an appendix. In many instances instruments constructed for use at certain frequencies may be compensated for use at somewhat higher frequencies.

The insertion of the instrument in the circuit always modifies the circuit conditions. Generally, the effect of this modification is negligible. However, a voltmeter which takes appreciable current compared to the load current or an ammeter which has an appreciable voltage drop compared to the load resistance can cause appreciable error. Each case should be analyzed by itself to determine the effect of instrument insertion.

In selecting an instrument, other things being equal, one which gives an indication in the upper half of the scale is to be preferred. Then the limit of error of the instrument, stated in terms of full scale deflection, will not be as large compared to the measured value as if a small deflection were accepted. Also, better readability is obtained because of better spread of the scale.

The various principles on which commonly used portable indicating instruments operate are outlined in the appendix[1] following, and the applicability of each type is generally indicated.

In conclusion the following is quoted from F. K. Harris, Physicist of the National Bureau of Standards[2]: "The art of measurement is as much a matter of one's attitude and way of thinking as it is a collection of devices and techniques whereby one can push buttons or turn knobs and so learn how big something is or how nearly alike two things are." We must give attention to details even in so prosaic a device as a voltmeter if we desire a true measurement.

The appendix which follows describes in greater detail the types of instruments spoken of in this article. Instruments are there broken down by five general types, with variants of some of the types also listed.

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[1] Some of this data has appeared in a manual entitled "Electric Instruments" published by the General Electric Company, GET-1087.

[2] Electrical Measurements, John Wiley & Sons, 1952.

APPENDIX

Characteristics of Portable Electrical Indicating Instruments

1. PERMANENT-MAGNET, MOVING COIL INSTRUMENTS:

USE: Direct current.

PRINCIPLE: Movable coil carries measured current; interaction with permanent magnet produces torque.

COILS: Wound to carry from 20 uA to 25 ma.

CURRENT: Range extended by shunts, built-in up to 50A.
Higher current requires external shunts.

VOLTAGE: Used with internal series resistor.
External resistors, called multipliers, used for very high d-c voltages.

SCALE: Essentially linear.

ACCURACY: Very good; 0.5% commonly attained.

VARIANT: MOVING-MAGNET INSTRUMENTS:
Same principle, but different construction.
Has cylindrical moving magnet.
Low sensitivity, sturdy, low cost.

2. RECTIFIER INSTRUMENTS: Full wave rectifier and permanent magnet d-c instrument.

USE: Frequencies up to 10 KC. Measures average, not rms value. When scale is marked in rms units, instrument must be used on sinusoidal wave-shapes.

PRINCIPLE: Rectifier bridge converts alternating to unidirectional current.

COILS: High sensitivity moving coil element permits sensitivity of 1,000 ohms per volt.

CURRENT: Rectifier limited to about 15 ma. Mostly used in milliampere and microampere range. Not suited for use with shunts due to temperature coefficient of the rectifier. Can be overloaded several hundred percent.

VOLTAGE: Series resistor in a-c input.

SCALE: Essentially linear.

ACCURACY: ± 5% due to aging of rectifier.

3. THERMOCOUPLE INSTRUMENTS (RADIO-FREQUENCY INSTRUMENTS):

USE: Frequencies up to several million cycles per second; indicates rms values of any wave form. Direct current also, but offers no advantage, except as means of calibrating.

PRINCIPLE: Resistance heater is energized by measured current and raises temperature of a thermo-junction. Generated voltage deflects permanent magnet moving coil element.

COILS: Extremely light armature, low resistance (5 ohms), full scale response at about 15 mv.

CURRENT: Normal use—limited only by heater coil construction—3 ma to 300 A. Great danger of damage by overloading since heater temperature increases as square of the current.

VOLTAGE: Not normally used for voltage, but can be used with resistor in series with heater. Can provide sensitivity up to 500 ohms per volt. 0.5 to 150 volts.

SCALE: Normally compressed at low end, but may be linearly expanded by applying non uniform magnetic field in the element.

ACCURACY: Not as high as other types for DC or low frequency measurements. Ambient temperature error causes some error.

4. MOVING IRON INSTRUMENTS:

USE: A-C generally from 25 to 125 cps, but specially calibrated up to 1,000 cps. In-

(Continued on page 32)

Theatre Television Progress†

By NATHAN L. HALPERN
Theatre Network Television, Inc., New York

"Slowly simmering . . . theatre television will erupt suddenly . . . the future is bright," opines this author, who is a specialist in the business of providing video programs for theatres exclusively. He reviews the status of theatre Tv today.

THERE ARE four areas covered in this report: (1) the industrial development of theatre television; (2) programs for theatre television; (3) the public's reaction to these programs, and (4) the distribution of programs to the theatres.

Today there are over 75 theatres in 37 cities from coast to coast with large-screen television equipment. Television installations will be made eventually in all motion picture theatres in the country. The harnessing of this form of television by the motion picture industry will offer the public a new and different service. Theatre television will become a valuable national resource.

Audience Reaction and Requirements

Despite its early stage of growth there have already been over 300 individual theatre presentations of large-screen television programs. With few exceptions, these early presentations were experiments, conducted to test public reaction. They clearly demonstrated that this new medium satisfied and pleased its audiences. It has been, in fact, public acceptance that caused the further development of theatre television.

The conditions necessary for successful special event presentations have been emerging in the past year. Exclusivity, proper promotion, and some regularity are desirable, if not necessary. Matinee sports presentations, which bring new sports audiences into theatres at unprecedented times, require all three of these conditions.

A series of six fights, presented by Theatre Network Television (TNT) was offered to a public that was unacquainted with the medium, and for this reason under adverse circumstances, yet the box office results were nothing short of startling. On several of the fights, the numbers of people turned away from box offices for lack of seats were much larger than the number packed into the theatres. The overall average attendance for all theatres on all six TNT fights was 87 percent of capacity, despite the fact that two of the fights were not top attractions. And the turn-away crowds at the more popular fights were only part of the larger population that would have attended but for theatre television's limited capacity to accommodate the public.

† Cond. from J. SMPTE, August, 1952.

Of importance, too was the drawing back of part of the "lost audience"—non-movie-goers—to the motion picture houses. New audiences added to normal film audiences will expand theatre business in the years ahead.

Economics of Theatre Tv

Normally a major medium must pass through an investment period at the start, with operating losses until it has grown sufficiently. The pioneers in home television broadcasting made large-scale investments and sustained high losses for years of operation—losses that ran into millions of dollars for single stations—before they were in the black. The significant thing about theatre television is that it has experienced profits on some events from the outset. But before examining the credit side of the ledger, let's take a look at the debits.

The relatively small losses that were incurred in early theatre television are attributable to the small number of theatres involved to share the program cost, to the pricing policies followed by theatremen, and to the absence of a regular, year-round flow of programs and promotions.

As long ago as last summer theatres carrying the TNT series of prize fights made profits on some fights, in spite of the very small number of theatres participating. Naturally, a larger number of participants will reduce individual costs and turn losses into profits; and the profits will then increase as the number of television exhibitors grows.

Another prime factor in the difference between profit and loss on theatre television events was the initial low admission price policy followed by exhibitors. At the beginning, they were literally giving the product away to see whether people liked it. Some seemed to treat theatre Tv as a bonus added to the feature movie, not realizing that the real box office pull was the television and not the movie.

Canada Inaugurates Tv

Television in Canada was inaugurated September 6th, at Montreal. On September 8th a second station went on the air, from Toronto. Both are government-operated and represent the beginning of a projected nationwide circuit. The third station will be opened next year in Ottawa.

Some theatres charged as little as 54 cents net admission for the first theatre televised fights. But as theatremen saw the public demand and satisfaction, they began to adjust admission prices upward. By the time of the Robinson-Turpin bout the average admission was well over $2.00. Yet every theatre carrying the fight sold out, again evidencing the public's enthusiastic acceptance of this new entertainment medium.

The average television gross was $5,000 per theatre, with seating capacities ranging from 1,100 to 4,000 seats. Moreover, concession sales increased as much as 400 percent above average. It became apparent that if higher prices had been charged for the earlier theatre television events those also might have resulted in substantial profits.

As an example, Theatre X, an actual theatre, has 3,300 seats. At a $2.40 gross admission price, and a sellout with 473 standees crammed in, the net receipts, after taxes, were $7,500. Total television costs to the theatre (relatively high because there are still so few theatre installations) were $4,000, leaving an operating Tv profit of $3,500. After deduction of house expenses and film distribution costs this exhibitor was still left with a whopping profit for a single show. His only regret was that he had to turn away thousands of disappointed people for lack of room.

The third factor affecting early theatre television—absence of a regular, year-round flow of programs—is due in part to the newness of the medium.

Crafts Cooperate

The development of entertainment attractions, to go along with outstanding sports events, has preoccupied those of us in theatre television. Entertainment for theatre television must, of course, be superior. In this developmental work talent and craft unions were faced, for the first time, with making decisions on theatre television. Most of these unions have recognized the importance of this new field and its gainful potentials for their memberships, as well as its public service aspects, and their attitudes have been progressively more and more cooperative.

It is encouraging to report that there is a wealth of superior talent and entertainment eagerly awaiting the development of theatre television. There is no lack of great entertainment, superior to home television, and different from movies, for theatre Tv programs. Once the ground rules have been worked out, TNT will launch a schedule of these programs.

Transmission Limitations

Of paramount importance in limiting the past presentation of theatre television programs has been the unavailability of

(*Continued on page* 30)

IN THE

SPOTLIGHT

PROVISIONS for health and welfare plans have become increasingly important factors in labor-management contract negotiations. In many instances they take precedence over all other benefits. Chicago Local 110 blazed the trail in theatrical employer-labor relations when Gene Atkinson, business representative of the Local, publicly announced on August 5, 1948 the consummation of a five-year pact with all the Chicago area theatres which included a health and welfare fund amounting to $2 million. (*See IP for August*, 1948, *p.* 17.) Since then other IA Locals have followed the pattern set by Local 110 and today such plans have become integral parts of most contracts.

The latest health and welfare plan to come to our attention is that incorporated in the two-year contract recently concluded between San Francisco Local 162 and most of the major and independent theatres in its jurisdiction. We believe that the following highlights of the Local's plan are sufficiently interesting to warrant listing herein:

LIFE INSURANCE: $2500.

ACCIDENT, DEATH AND DISMEMBERMENT: $2500.

ACCIDENT AND SICKNESS: 1st day accident, 8th day sickness, 26 weeks, weekly benefit, $20.

HOSPITALIZATION: $12.00 per day hospital room and board and general nursing care for a maximum of 100 days for each disability.

SPECIAL HOSPITAL SERVICES: All necessary special hospital services when confined as a bed patient, up to $1500.

OUT-PATIENT SERVICES: Use of operating room, anaesthetics and their administration, and diagnostic X-ray and laboratory examinations when *NOT* confined as a bed patient, up to $100.

SURGICAL BENEFITS:

(1) *Surgeon's Fees*—Fee of operating surgeon for surgical operation in accordance with the Schedule of Operations, up to $400.

(2) *Assistant Surgeon's Fees*—Fee of surgeon assisting at operation up to 10% of the fee allowed for the particular operation under the Schedule of Operations, maximum of $40.

(3) *Special Surgical Services* — Special services in connection with a surgical operation performed outside the hospital in a doctor's office or at home, including anaesthetics and their administration, dressings, splints and casts up to a maximum of 20% of the fee allowed for the particular operation under the Schedule of Operations —$80.

(4) *Maximum Benefits*—For all operations during each period of disability—$800.

MEDICAL CARE: Any licensed physician ("MD" or Osteopath)—$4 hospital calls, $400 maximum; $4 office calls; $6 home calls; 1st call accident, 3rd call sickness.

DIAGNOSTIC X-RAY AND LABORATORY FEES: Charges for X-ray (excluding dental X-rays) and laboratory examinations made for diagnostic purposes, in a doctor's office or clinical laboratory, will be paid as follows: $50 maximum.

ADDITIONAL ACCIDENT BENEFIT: All excess medical and hospital expense (including special nurses) required within 90 days of injury sustained as a result of a non-occupational accident which is *NOT* covered by other benefits of the plan, up to $300.

POLIOMYELITIS: All medical and hospital expenses (including special nurses) incurred within *TWO YEARS* of inception while insured, for treatment of poliomyelitis, in lieu of other benefit under the plan, up to $5,000.

• S. A. Seifert, member of Local 203, Easton, Penna., and secretary of the Easton Central Labor Union, attended the recent AF of L Convention in New York City as CLU delegate.

• Peaceful but effective picketing of a theatre is the method used by the officials of Local 322, Charlotte, N. C., against the management of the South 21 Drive-In Theatre in that city. In a letter to this office, D. K. Chastain, president of the Local, outlined the procedure followed by the union which has very definitely cut down box-office receipts.

"We keep a constant check of every car crossing our picket line," writes Chastain, "also those that are stopped by it. We record the numbers of the cars that cross it and after the ownership of each vehicle is established, a card is mailed to the owner the same night so that he will receive it in the morning mail. Receipt of these cards by the picket-line violators meets with varied reactions; but the fact that they are known to us has a very definite restraining effect—this is confirmed by the very few repeaters.

"Our pickets have set criteria for courtesy to all who inquire — explaining briefly and intelligently why we are there. . . . To gauge ahead the results of our picketing would at best be only guesswork, but we do feel that the long-range effect upon other theatres is working to our advantage. We have served notice that we mean business!"

To Local 322 officials we extend our very best wishes for a successful settlement of this controversy.

• The Motion Picture Industry's Joint Defense Appeal appointed three IA men to key posts in the industry's drive on behalf of JDA. Serving as co-chairmen of the Labor Division are Herman Gelber, president of New York Local 306; Thomas Murtha, business representative of Brooklyn Local 4, and Vincent Jacobi of New York Local 1.

• Eighteen months of intensive picketing by the members of Local 163 forced the management of the Scoop Theatre in Louisville, Ky., to close its doors. The efforts of Local 163 officials to effect an amicable settlement with the exhibitor were fruitless and they were left no alternative but to picket the theatre.

• According to a statement released by the U. S. Labor Department's Bureau of Labor Statistics, the retail food price index reached a new peak with an increase of 1.2 per cent between June 30 and July 15.

• The Hollywood Film Council, AF of L, is seeking government aid in barring the importation of films made abroad by persons accused of subversive activities. In a letter to the House Committee on Un-American Activities, Roy Brewer, IA West Coast representative and Council chairman, singled out the picture "Encounter" which was produced in Italy by a group of men who were named as Communists by the House Committee. The film is slated to be released in this country by United Artists. The House Committee has been asked to take action to keep this film out of the American market.

• IA West Coast Representative, Roy M. Brewer •

• A St. John, N. B. (Canada) projectionist has been appointed chairman of

the New Brunswick board of censorship. George Enos, for over a quarter of a century projectionist for the board, was named to the post—the first projectionist in the history of Canada to hold such office.

• Thomas Kearney, president and John Forde, business representative, San Francisco Local 162, attended the convention of the California State Federation at Santa Barbara, September 3.

• An attempt by the Canadian Broadcasting Corporation to televise a stage presentation at the Melody Fair tent show in Dufferin Park, Toronto, was thwarted by officials of the Toronto IA Locals who refused to permit the CBC cameramen to enter the tent. The IA officials based their refusal on their contention that the broadcasting company's technicians were non-union men.

It is expected that the matter of union jurisdiction will come up on the floor of Parliament in Ottawa this Fall.

• Under a new contract signed with the Theatre Owners Association, Chester Demaree, business representative of Local 163, Louisville, Ky., obtained a $2 per week increase for 24 members of the Local. This makes the new wage rate $91 weekly, effective immediately. Manpower was the bone of contention in the negotiations, with the exhibitors wanting to reduce the number of projectionists in each theatre from four to two. Demaree's persistence won out and the manpower remains unchanged.

• According to a recent announcement by the Quebec Liquor Commission, television will not be permitted on premises licensed by the Commission. It is said that the ban is based on the ruling found in the Revised Statutes of the Province of Quebec, as follows:

> No holder of a permit to sell certain alcoholic liquor in a hotel, inn, cafe or restaurant shall give any performances or shows or allow dancing, even under municipal authorization, without the Commission's consent.

• Thirty-five Local Unions, affiliated with 20 Internationals, AF of L, were represented recently at the 7th annual Kentucky Labor School, sponsored by the Department of Research and Education of the Kentucky State Federation of Labor. The class comprised 73 students from Kentucky, Ohio, Indiana, and West Virginia.

• Addressing the American Legion convention in New York City last month, William Green, AF of L president, asked for mutual understanding between the Legion and organized Labor. He reminded the delegates that close cooperation between the Legion and the trade union movement would act as a mighty counterforce against the inroads of Communism in this country.

• Hugh Sedgwick, for many years secretary and business representative for Local 303, Hamilton, Ont., was elected by acclamation at the recent convention in Minneapolis to be 8th IA vice-president, filling the office left vacant by the late Wm. P. Covert of Toronto Local 173.

Sedgwick has long been an active figure in Canadian labor circles, and has had the distinction of being the first film

Sedgwick examining a British-made projector at the 1951 Trade Union Congress.

man chosen to represent Canada at Britain's Trade Union Congress, which was held last summer. He is also chairman of the Hamilton Planning Board, and is a member of the board of directors of the Hamilton General Hospital.

Pat Travers, Toronto Local 173, was named secretary-treasurer of District No. 11, succeeding Sedgwick, who held the office for many years.

• From one job to another! IA President Richard F. Walsh just about got his bags unpacked after the 41st IA convention at Minneapolis (ended August 8) before taking ship (August 20) to England to appear as Fraternal Delegate representing the AF of L at the British Trades Union Congress (September 1-8). President Walsh brought to the assembled representatives of British workers the greetings of their American colleagues and a brief discussion of the world situation as it currently affects labor in all democratic countries.

Of particular interest to members of the IATSE was the election of Tom O'Brien (Member of Parliament) to the presidency of the British Trades Union Congress, since O'Brien's trade union position in Britain corresponds roughly to President Walsh's in the U. S. and Canada. O'Brien, MP, is secretary-general of NATKE—National Association of Theatrical and Kinema Employes—the British counterpart of the IA. Many will recall that he scored a striking oratorical success at the IA Cleveland convention in 1948. NATKE and IA have always worked together harmoniously.

President Walsh left Britain shortly after September 8 to appear as a participant in the AF of L convention opening in New York September 15. From one job to another!

Show This to Your Employer

Visible proof that the IA regards itself as a full and helpful partner in the motion picture industry is this match tab, paid for by Local H-63, New York City, and abundantly in evidence at the recent 41st Convention. A number of employers and employer representatives appealed to the Convention for cooperation in inducing the public to visit motion picture theatres more frequently. Among others, Major Leslie Thompson of RKO, pleaded: "Right now we need a booster campaign. . . . Organized labor is in a position where you can boost more effectively than almost any other element in the business."

In answer, IA President Richard F. Walsh made known that the IA is already doing just that, and cited this match tab as one example. Said Walsh: "We have started on the drive and have done everything that COMPO has asked us to do. Our Locals have done things in the cities and towns. . . . Delegates have shown me match boxes and posters and little trinkets they have gotten up themselves and paid for. . . . They are in there pitching."

GO TO THE

T A S E H-63 I 3

MOVIES TONITE

The American Labor Movement

Prepared by the Department of Labor for official use and reference, this history traces labor activity and legislation from Colonial times to today.

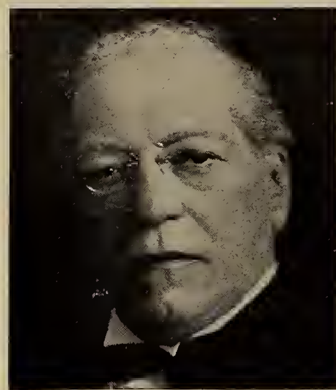
Chapter II. Development of the Modern Labor Movement

THE Noble Order of the Knights of Labor was founded by Uriah S. Stephens in 1869 as a small local union of Philadelphia garment workers. It expanded slowly as various other craft unions joined. For some years it functioned as a secret society with an elaborate ritual, a practice best understood in the light of the difficulties experienced by unions at the time when, as one contemporary labor leader wrote, "a great deal of bitterness was evinced against trade-union organizations, and men were blacklisted to an extent hardly ever equaled." Most of the secrecy, however, was abandoned by 1881.

From an estimated membership of 10,000 in 1879 the Knights of Labor grew rapidly until by 1886 it claimed over 700,000 members throughout the country. Structurally, the Knights consisted of a national body or general assembly exercising centralized control over numerous district assemblies, each of which was composed of five or more local assemblies. Local assemblies were of two kinds, trade and mixed. The former included members of only one craft while the latter admitted a wide range of occupations and professions. The first general assembly, called in 1878, elected Stephens as Grand Master Workman. He resigned shortly thereafter and was succeeded by Terence V. Powderly.

The Order had a broad aim: the replacement of a competitive society by a cooperative one which would give workers the opportunity to enjoy fully the wealth they created. This was to be achieved primarily through reducing the "money power" of banks, not through battles with individual employers. More concretely, the Knights' program called for the 8-hour day, equal pay for equal work by women, abolition of convict and child labor, public ownership of utilities, and the establishment of cooperatives. Reliance was placed on educational and political methods rather than on collective bargaining. Strikes were to be employed only as a last resort.

During the eighties, however, when the "practical trade unionist" forces gained influence, the Knights engaged in a series of strikes for better wages and made wage agreements with employers. Their most successful struggle, with the powerful Gould railway system in 1885, brought them particular prestige.



Samuel Gompers

An internal conflict led to the decline of the Knights of Labor. Leaders who favored processes of collective bargaining clashed with those committed to political means and basic social change. Moreover, the immediate interests of the skilled and unskilled workers whom the Knights attempted to unite were not so easily reconciled. The stronger craft unions resisted affiliation and by 1886 came into open rivalry with the Knights of Labor.

After formation of the American Federation of Labor, the Knights steadily lost ground. In 1890, the Knights reported only 100,000 members. Thereafter, the Order continued to lose members and ceased to be an influential factor in the labor movement, although continuing in existence until 1917.

The American Federation of Labor

By 1881 the nucleus of a new organization had taken shape. Devoted to "pure and simple unionism," its goals were higher wages and improved working conditions. The craft unions surviving the depression of 1873 were almost exclusively absorbed in problems of their respective trades. Many of these unions developed strong, centralized, national organizations supported by an increasing number of local lodges. Benefit funds were also collected to assist their members or their families during strikes and times of financial stress due to unemployment, injury, or death.

In 1881, six prominent craft unions—those of the printers, iron and steelworkers, molders, cigar makers, carpenters and glassworkers—and a variety of other labor groups met in Pittsburgh and established the Federation of Organized Trades and Labor Unions. Its leaders were Samuel Gompers and Adolph Strasser, both of the cigar makers' union. At the start the Federation had approximately 45,000 members; for 5 years it remained weak and was overshadowed by the Knights of Labor.

When the Knights at their annual convention in 1886 refused to agree to respect the jurisdiction of the large craft unions, several of the latter met at Columbus, Ohio, and founded the American Federation of Labor. The F.O.T.L.U., also in convention at Columbus, amalgamated with the new group. Gompers was elected first president of the new Federation, a position he held, with the exception of 1 year (1894-95), until his death in 1924.

The strength of the AFL resided primarily in the unions of carpenters, cigar makers, printers, iron and steelworkers, and iron molders. It began with a membership of about 138,000 in 1886 and slowly doubled that number during the next 12 years.

Renewed Industrial Conflict

In the three decades following 1890 the AFL consolidated its position as the principal federation of American unions. The first decade of growth was slow, but from 1900 to 1904 membership rose rapidly, from half a million to a million and a half, and then increased irregularly to 2 million by the outbreak of World War I. During and immediately following the war years, membership again rose rapidly, reaching more than 4 million in 1920.

During this entire period an estimated 70 to 80 percent of all union workers were in the American Federation of Labor. The most important unaffiliated group of unions was the four railroad brotherhoods which usually maintained friendly relations with the AFL affiliates. The other nonaffiliated unions were a mixed group. They frequently were rivals of the AFL unions. Some were AFL secessionist groups. Membership among this "independent" or unaffiliated group rose from approximately 200,000 in 1900 to almost a million in 1920, according to estimates Prof. Leo Wolman made for the National Bureau of Economic Research.

Before World War I the principal union gains occurred in the coal mining, railroad, and building-trades unions. The most important union of coal miners was the United Mine Workers, an industrial union which, after a strike in 1902, established itself as the largest and one of the most completely organized affiliates of the AFL. In other industries, organizations of crafts or amalgamated crafts still largely prevailed.

The emergence of the labor movement as an influential national economic group

did not occur without opposition or setbacks. In the 1890's, large corporations which had appeared on the economic scene vigorously fought the efforts to unionize their employees. At times these clashes resulted in violence, injuries, and even death. For example, the unsuccessful struggle of the Amalgamated Association of Iron and Steel Workers against the Carnegie Steel Co. at Homestead, Pa., in 1892 was climaxed by a pitched battle between company-imported Pinkerton detectives and strikers which resulted in 10 deaths before the intervention of the National Guard restored order.

The strike of the American Railway Union led by Eugene V. Debs against the Pullman Palace Parlor Car Co. at Pullman, Ill., in 1894 provoked sympathetic walk-outs on many railroads serving the Chicago area. Federal and State troops were used and court injunctions were obtained against the union. Twenty-five persons were killed and 60 were injured during this controversy. Elsewhere in the country industrial disputes sporadically flared into open violence.

After 1902, following a period of rapid union growth, employer opposition stiffened and became more highly organized. Prof. Carroll Daugherty, in summarizing this trend in his book *Labor Problems in American Industry*, wrote:

> Most of the powerful ones [employers], believing that unionism was growing too strong and fearing further encroachments on their control of industry, decided to break off relations, and the years from 1902 to World War I were characterized by a definitely increasing anti-unionism.

Daugherty then adds:

> Scientific management and "efficiency" systems were introduced in many plants, much to the discomfiture of many skilled craft unions. A variety of union-smashing tactics were adopted by employers. Vigilante groups and citizens' committees were fostered to resist unionization activities. Court decisions upheld as a rule most of the employers' anti-union practices. In the face of these new difficulties the membership of the AFL at first fell off a little and then resumed growth at a much slower rate than before 1902.

Despite general employer opposition to unions, however, an increasing number of "trade" or collective-bargaining agreements were resulting from direct negotiations between unions and employers. The stabilization of industrial relations and the attainment of job security are considered by many authorities as important factors in the success of AFL trade-unionism at this period.

Labor's "Nonpartisan" Politics

During the years between 1900 and the beginning of the First World War, unions concentrated on raising wages, establishing the 8-hour workday, and securing other improvements in working conditions through collective bargaining. On the whole, they resisted the efforts of various political forces in the labor movement to obtain union support for partisan programs.

The political role of organized labor was debated in various conventions of the AFL at the turn of the century when, according to Lewis Lorwin, "The principle of non-partisan politics, summed up in the dictum 'to defeat labor's enemies and to reward its friends,' received official sanction." In practice this principle meant that the AFL opposed any "independent labor party" but officially supported measures and candidates and even the programs of regular political parties favorable to the interests of labor.

As a consequence, labor was frequently successful in obtaining legislative reforms. The first years of the century, for example, saw the passage of several State laws regulating the employment of women and children in industry and providing for protection against industrial hazards. Workmen's compensation laws were adopted in most States, and in 1913 the United States Congress created a separate Department of Labor.

Clauses inserted in the Clayton Anti-Trust Act of 1914, at the insistence of the AFL, exempted unions from prosecution on the ground of engaging in restraint of trade and sought to limit the issuance of injunctions by Federal courts in labor disputes. This law was hailed by Samuel Gompers and others as the "Magna Carta" of labor. Enthusiasm over the Clayton Act was short-lived, however, since subsequent court interpretations virtually nullified labor's anticipated gains.

In 1915, Congress passed the Seamen's Act, regulating many of the conditions of employment for American sailors; the

(*Continued on page* 30)

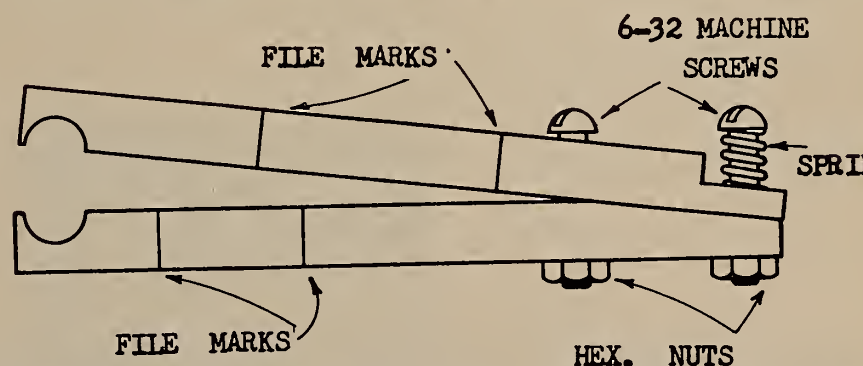
New Aluminum Gimmick for Handling Hot Carbons

By J. G. JACKSON
Capitol Theatre, Port Alberni, B. C., Canada

IN ALMOST all projection rooms a pair of pliers is used to adjust and handle hot carbons. Steel pliers present a certain amount of hazard because of their weight, since if they slip a shattered mirror may be the result. To minimize this hazard, and to provide a gimmick handier than pliers, the writer has made the device pictured here out of scrap aluminum.

This tool is made of two aluminum then drilling with a drill slightly smaller than the negative carbon; for example, a 7/32 drill for a 6-mm negative, 17/64 for 7-mm and 5/16 for 8-mm. This makes for a snug grip on the negative, while the positive carbon is held tightly by the edges of the grooves.

To use, hold the tool in the palm of the hand with fingers and thumb about half way up the bars and simply press



Aluminum bar carbon gripper developed by the author, with file marks to gauge usable lengths of positive and negative stubs.

bars each 5/16" square and 4" long. The top bar is cut at one end, and the lower bar tapered at one end, as shown. The lower bar is drilled for 6-32 machine screws and the upper bar drilled for slightly larger holes. The lower bar is tapped to take the screws; the hex nuts serve as lock nuts to prevent the screws working loose. The light spiral spring on the back screw keeps the jaws normally open.

The groove at the front of the jaws is made by clamping them together and

with the thumb to grip the carbon; to release, ease thumb pressure and the spring opens the jaws.

File marks on the upper bar are spaced to act as a gauge for positive carbon stubs and those on the lower bar to gauge negative stubs.

[Note: The British Journal of Photography for August 29th reports that Mr. Jackson has just been granted a British patent for another of his inventions, a reel-end alarm, patented in the United States in 1947.]

16-mm

BECAUSE EXPANSION OF 16-mm ACTIVITY PROVIDES INCREASING FIELDS OF EMPLOYMENT FOR SKILLED PROFESSIONAL PROJECTIONISTS IN Tv STUDIOS AND NON-THEATRICAL SHOWINGS, AS WELL AS ENHANCED POSSIBILITIES OF PERSONAL BUSINESS VENTURES, THIS NEW DEPARTMENT OF IP WILL APPEAR MONTHLY HEREAFTER.

IA Locals Active in 16-mm Projection Work

Survey by IP shows 16-mm provides profitable employment for members of half of all IA Locals; and that 50 per cent of the Locals whose members do such work actively seek and claim it through business agents or other direct efforts.

MORE THAN half of all IA Locals, statistically speaking, benefit through 16-mm projection in that their members find varying degrees of employment in the narrow-gauge field. This figure is statistical only; it is based on a survey questionnaire issued by IP. Not all Locals queried responded. Of those that did, more than half, 56 percent to be exact, stated that their members did more or less 16-mm work in addition to standard 35-mm projection.

Among the 44 percent of Locals responding whose members are not recorded as doing any 16-mm work, a number reported that the reason was absence of such activity in their indivdiual territory.

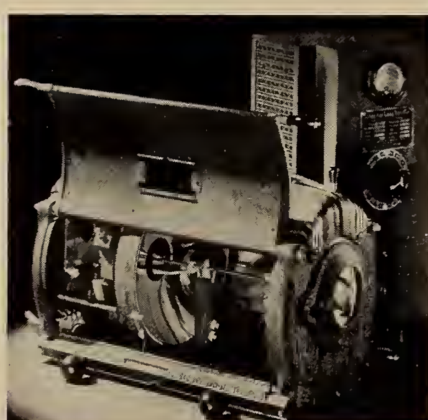
Among that large group of Locals responding whose members do have 16-mm work, fully 50% make an active effort, through the business agent or other facilities, to obtain this type of employment. Among 14 percent the effort is made, not by the Local or its officers, but by the members themselves. The remaining 36% take a more passive attitude toward narrow-gauge work: 21 per cent supply projectionists on request but apparently do not try to bring in such requests; while the efforts and attitudes, if any, of the remaining 15 percent cannot be determined from their questionnaire replies.

How They Get the Work

Many and various are the methods used by different Local Unions to get 16-mm work for their members. Some leave the matter to the initiative of the business agent. Another method is by means of a committee specifically formed to seek out such work and to watch carefully for every chance of it. Another is by standing agreement with various auditoriums in the Local's territory where 16-mm is likely to be shown. Still another is by attending meetings of organizations likely to use 16-mm from time to time. Another is to approach promptly the sponsor of every 16-mm showing as soon as the same becomes known—although one Local official reports ruefully that many of these "have been shown and are gone by the time we find out about them."

Still another method is through a separate 16-mm organization, owned and operated by the Local, which solicits 16-mm business on a business basis. A variation of this approach is an arrangement whereby the Local Union as such owns the 16-mm projectors and solicits opportunities to rent them out, along with the services of the projectionist.

A large minority of Locals, as already noted, find that although they do not solicit or seek 16-mm work for their members, it comes to them. Business firms and other organizations that plan a 16-mm showing voluntarily approach the local IA group and of their own accord seek either to rent equipment or hire a projectionist for it, or both. In such cases, although the Local Union may not own 16-mm apparatus either directly or indirectly, generally some of its members do.



Designed specifically for 16-mm projection, this Strong Electric Corp. type No. 21000 arc has a carbon burning time of one hour—the running time of one 2000-foot 16-mm reel. Current is 30 amperes, providing the maximum intensity of radiant energy that 16-mm stock can withstand without buckling. Trim is 6-mm x 8½-inch positive and 5½-mm x 6-inch negative Pearlex carbons; rated efficiency f/1.6. Associated rectifier incorporates two 15-ampere Tungar tubes, delivers 30 amperes at 28 volts.

Ownership of Equipment and Training

In fact, 18 percent of the Locals whose members do 16-mm work can supply the projection facilities, either as their own property or as the private property of members. In exactly half such cases—9 per cent of the total—the Local is the owner, directly or indirectly; and in 9 percent the members as individuals are.

A 16-mm projector owned by a Local member is not necessarily operated by him. He may rent it out and let another member operate it; in this way the revenue is spread and experience in the use of different makes and models is distributed.

Thirteen percent of the IA Locals whose members do 16-mm work maintain courses of instruction in it. This figure, however, includes those Locals that do not maintain standing classes but give instruction on occasion "as required." Still other Locals find no instruction necessary: their members are familiar with 16-mm units, have had experience with them in the armed services or elsewhere in the past; or are informally instructed by some fellow-member while actually on the job. Still others report that their small membership, or widespread jurisdiction, makes instruction impracticable.

Geographical Distribution

Geographical distribution of IA participation in 16-mm activity is rather uneven, with far the greatest participation—41 percent—in the Middle West. New England and the North Atlantic States come next, with 21 percent of the total. The South and the Mountain States are tied at 14 percent each; and the West Coast lags with only 9 percent.

Among individual states, Michigan leads; 14 percent of all the IA Locals whose members are doing 16-mm work are in Michigan. Massachusetts and West Virginia are tied for second place; 9 percent of all IA locals whose members do 16-mm work are in each of those states.

(*Continued on page* 28)

How to Book 16-mm Prints

16-mm pictures can be bought, leased, and rented; and thousands can be borrowed without charge. Sources of 16-mm films, and customary procedures for selecting, pre-viewing, booking and showing them, are outlined herein.

THREE procedures are open to the projectionist in the 16-mm field. He can sell his services to operate other people's 16-mm equipment and show their films; he can buy (or rent) 16-mm apparatus and sell the use of it as well as his services. He can also book the picture, offering the entire show—projectionist, projector, *and* film.

The variety of 16-mm product is enormous, far wider than in the case of theatre product. There are 16-mm entertainment films—simply motion pictures quite similar to those shown in a theatre and, in fact, sometimes the same ones—old timers reduced onto the narrower stock. In addition there is a large supply of educational, industrial, and religious films. Films teaching safety or hygiene, training, advertising, and institutional films are also available. Audience for at least some of these films may be found in every community.

Training films are extensively used by industry, and also by the armed forces; there is a huge backlog of these available. Educational films are produced on a number of age levels; the print suited to one age group may be entirely unsatisfactory for another. The same applies to films made for religious education. In addition, there are religious prints that might be described with fair accuracy as sermons on celluloid.

The National Safety Council is one of the sponsors of films that teach safety in industry, on the highway, in farms and homes, first aid, and the like. (Many of these may be obtained without charge.) Advertising films are of two general kinds; some are used by salesmen or sales managers and have a direct selling approach; but others are purely "institutional" or "good-will" advertising. These latter tell an interesting story about some process or industry, or even perhaps some product, but they carry no direct sales message. They are often available without any charge. Travel films are largely similar to 35-mm theatre travelogue reels.

Sources of 16-mm Prints

Some producers make their films available only through local distributors—others directly. Local libraries of 16-mm prints exist throughout the United States and Canada. Dealers in 16-mm photographic and projection apparatus may maintain film libraries.

The extension service of the State university is also likely to have one; and museums, church federations, school systems, social organizations, health agencies, business firms, and industrial plants are among other possible sources of 16-mm prints that may prove just the type needed to please a specific local audience. Currently about two hundred public libraries stock 16-mm prints which are loaned out in the same way as library books. The United States, Canadian, British and other foreign governments have produced films that are available for public showings.

The problem of how to find the desired film or films has two parts: first, to find prints that *may be* suitable and then to arrange a preview to make sure they are. The first is the easier.

To find free prints: More than 2,000 films that are loaned without charge are described in "The Handbook of Free Films," published by Allanan Associates, 509 Fifth Avenue, New York City. The handbook itself is not free— it sells for $10 per copy. The "Educators Guide to Free Films," published in Randolph, Wisconsin, contains a similar listing and sells for $6 per copy.

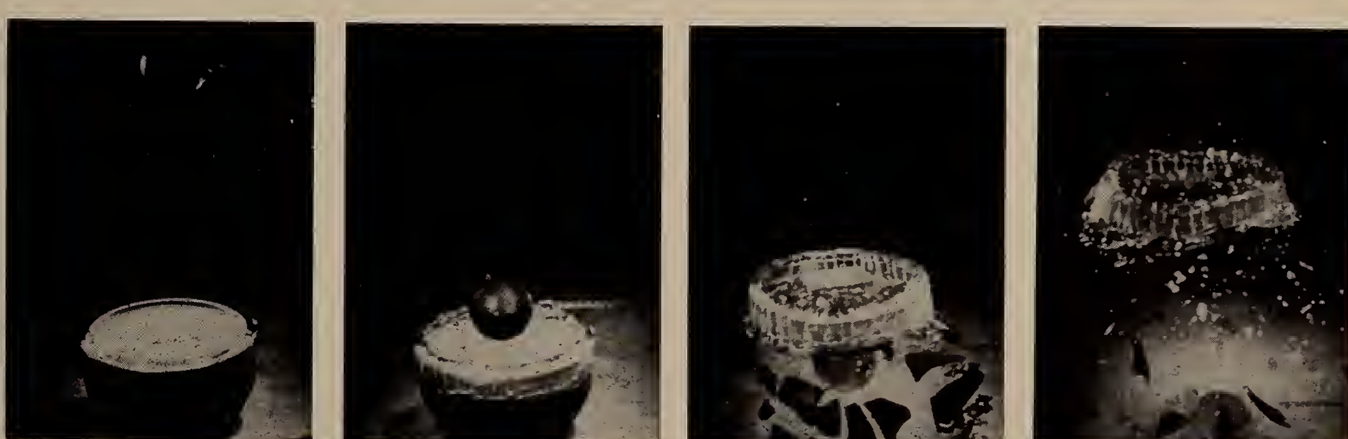
Over 8,000 films, (free, rental and for sale), some offered locally and some only through national agencies, are listed in the "Educational Film Guide," published by H. W. Wilson Co., 950 University Ave., New York City. The Government Printing Office, Washington 25, D. C., sells at 70 cents a booklet entitled "3,434 U. S. Government Films," which catalogs Federal government products available for loan, rental, or purchase.

Information concerning Canadian films can be obtained from the Canadian National Film Board, 1270 Sixth Ave., New York City, or at 400 W. Madison, Chicago. For information pertaining to British films, write to the British Information Services, 30 Rockefeller Plaza, New York City, or 37 South La Salle St., Chicago. The United Nations Film Board, United Nations, New York City, is equipped to supply information on all other foreign films that are available in the United States.

Local sources of films are listed in "Directory of 2002 16-mm Film Libraries," published at 30 cents per copy by the Government Printing Office, Washington 25, D. C. This list is arranged by state and cities and thus is very easy to use. Local film sources may also be found in the classified directory under "Motion Picture Film Libraries." Dealers in 16-mm equipment may know of other local sources of films; these are usually listed in the classified telephone directory under

(*Continued on page* 32)

SEEING EXACTLY WHAT HAPPENS WHEN THINGS TAKE PLACE "QUICK AS A WINK"

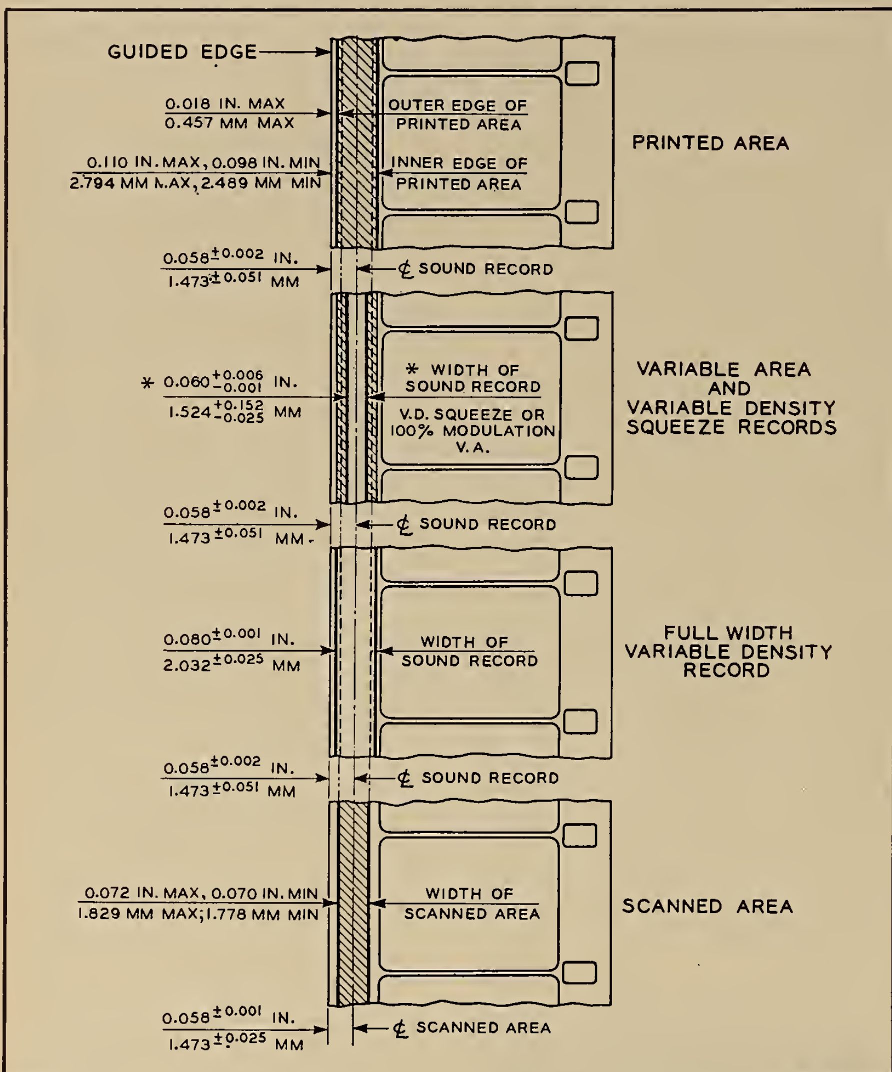


Successive stages in the shattering of a Tv tube as recorded by Eastman's new high-speed camera.

Accepted Standards for 16-mm Projection

PART III

Sound Records and Scanning Area (Z22.41-1946)



These Dimensions and Locations are Shown Relative to Unshrunk Raw Stock

Scanning-Beam Uniformity Service Type Test Film (Z22.81-1950)

1. Scope and Purpose

1.1 This standard describes a film which may be used for determining the uniformity of scanning-beam illumination in 16-mm motion picture sound reproducers. The recorded sound track shall be suitable for use in the routine maintenance and servicing of the equipment.

2. Test Film

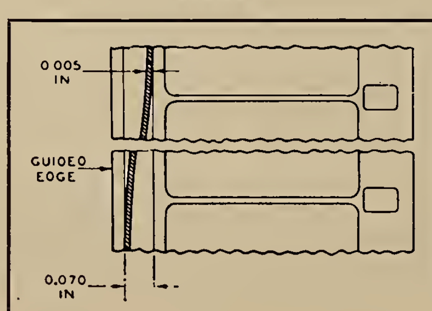
2.1 The film shall be a print from an original negative. It shall consist of a 1000-cycle, variable-area recording at full modulation of the 0.005-inch width and shall be approximately sinusoidal. The track shall move uniformly 0.067 inch from one edge of the scanned area to the other as shown in Fig. 1.

2.2 The position of the sound track relative to the ends of the light beam at any instant shall be shown by a diagram appearing in the picture area, the size and location of which is shown in American Standard Location and Size of Picture Aperture of 16-Millimeter Motion Picture Cameras, Z22.7-1950, or any subsequent revision thereof approved by the American Standards Association, Incorporated.

2.3 The scanned area shall comply with American Standard Sound Records and Scanning Area of 16-Mm Sound Motion Picture Prints, Z22.41-1946, and the film stock used shall be cut and perforated in accordance with American Standard Cutting and Perforating Dimensions for 16-Mm Sound Motion Picture Negative and Positive Raw Stock, Z22.12-1947, or any subsequent revisions thereof approved by the American Standards Association, Incorporated.

2.4 The length of this film shall be approximately 3½ feet.

FIGURE 1



Appendix

(*This Appendix is not a part of this American Standard.*)

Before using the above test film it is recommended that correct placement of the scanning beam be determined by means of buzz-track test film as specified in American Standard Specification for Buzz-Track Test Film for 16-Mm Motion Picture Sound Reproducers, Z22.57-1947, or any subsequent revision thereof approved by the American Standards Association, Incorporated.

The uniformity of scanning beam illumination may be measured by means of a db meter connected to the output of the sound projector amplifier. The illumination of the scanning beam should be adjusted according to the instructions furnished by the manufacturer and the variation of the output as registered on the db meter should be observed. The illumination is considered satisfactorily uniform when the output reading as measured by the meter is within ± 1½ db across the entire scanning slit.

Reel Spindles for 16-mm Projectors (Z22.50-1946)

1. Round Section

1.1 The round section of 16-mm motion picture projector reel spindles shall have a finished diameter of 0.312 ± 0.003 inch (7.925 ± 0.076 mm).

2. Square Section

2.1 The square section of 16-mm motion picture projector reel spindles, including finish, shall be 0.312 ± 0.003 inch (7.925 ± 0.076 mm) across the flats. Measurements across the flats shall be made in mutually perpendicular directions.

3. Cumulative Effect of Eccentricity

3.1 The cumulative effect of eccentricity of the round and square sections of the spindles, looseness and misalignment of the bearing, or other mechanical imperfections shall not cause the flange of a tight-fitting reel to depart from the ideal plane by more than 40 minutes of arc.

3.2 A suitable gage for determining the cumulative effect of eccentricity consists of a hub, with coaxial square and round holes

whose respective sides and diameter are equal in length, and a flange of suitable stiffness whose diameter is equal to that of an 800-foot reel flange, 10.5 inches (266.7 mm). The flange should be permanently joined to the hub so that its face is perpendicular to the axis of the hub with not more than 0.003 inch (0.076 mm) runout. The hub shall be provided with a thumbscrew for clamping the hub to the reel spindle so that one side of the round and square holes shall come in contact with the corresponding round and square sections of the reel spindle.

4. Reel Position on Spindles

4.1 The design of spindles shall be such that reels are kept under constant lateral pressure against a shoulder on the spindle. The part forming this shoulder need not be integral with the spindle. However, in such event, it shall be securely fastened to the spindle so that the two parts rotate together.

Multi-Frequency Field Test Film (Z22.44-1946)

1. Scope and Purpose

1.1 This standard describes a multi-frequency sound test film used for testing and adjusting the sound systems of 16-mm sound motion picture projection equipment. The test frequencies on this film are adequate for normal field and general laboratory use.

2. Test Film

2.1 *Frequencies.* The test film shall contain the following series of frequencies, each preceded by spoken announcement recorded at approximately 10 db below full modulation:

Frequency Cycles	Tone Footage Feet
400	12
50	6
100	6
200	6
300	6
500	6
1000	6
2000	6
3000	6
4000	6
5000	6
6000	6
7000	6
400	12

2.1.1 *Frequency Tolerance.* The frequency tolerance of the recorded signals shall be ±2 percent of the nominal frequency of each portion of the test track.

2.2 *Recording.* The test film shall be an originally recorded, splice-free, direct playback, positive variable-area sound track, recorded so that the modulated light is substantially constant when the film is reproduced with a scanning beam of negligible width. Modulation of the recording shall be 95 ± 5 percent at 7000 cycles. The level within any one frequency of each reel shall be constant to within ± 0.5 db. The recording shall be accomplished on a recorder so constructed as to keep the flutter content of the film to the absolute minimum consistent with the state of the art. The distortion of the recorded wave, up to a frequency of 3000 cycles, shall not exceed 5 percent.

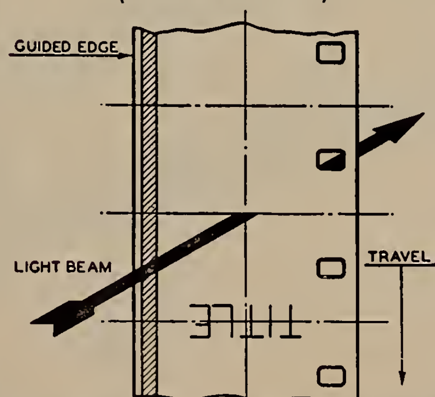
2.3 *Film Stock.* The film stock used for the test film shall be cut and perforated in accordance with the American Standard 16-Mm Sound Motion Picture Film; Cutting and Perforating Negative and Positive Raw Stock, Z22.12-1941, or latest revision thereof.

2.3.1 *Resistance to Shrinkage.* The film stock used for the test film shall have a maximum lengthwise shrinkage of 0.50 percent when tested as follows: At least 20 strips of film approximately 31 inches in length shall be cut for measurement of shrinkage. After normal development and drying (not over +80F [+26.7C]), the strips shall be placed at least ¼ inch apart in racks and kept for 7 days in an oven maintained at +120F (+49C) and a relative humidity of 20 percent. The strips shall then be removed, reconditioned thoroughly to 50 percent relative bumidity at +70F (+21.1C), and the shrinkage measured by an adaptation of the pin-gage method outlined in Research Paper RP-1051 of the National Bureau of Standards. The percent shrinkage shall then be calculated on the basis of deviation from the nominal dimension for the length of 100 consecutive perforation intervals given in American Standard Z22.12-1941, or the latest revision thereof, referred to in 2.3 above.

2.4 *Film Identification.* Each test film shall be provided with a suitable leader, title, and trailer, and shall be accompanied by a calibration of the level of the frequency recordings.

2.4.1 *Calibration.* The calibration shall be in terms of light modulation at the photocell with a scanning beam of negligible width, and shall be correct to within ± ¼ db up to and including 3000 cycles, and within ± ½ db above 3000 cycles up to and including 7000 cycles. The correction for each frequency shall be so stated that it will give the true level when the correction is added algebraically to the output level measured using the film.

Emulsion and Sound Record Positions in Projector (Z22.16-1947)



Drawing shows film as seen from light source in the projector

1. Emulsion Position

1.1 The emulsion position in the projector shall be toward the lens, except for special processes.

2. Speed of Projection

2.1 The speed of projection shall be 24 frames per second.

3. Distance Between Picture and Sound

3.1 The distance between the center of the picture and the corresponding sound shall be 26 frames.

Sound-Focusing Test Films (Z22.42-1946)

1. Scope and Purpose

1.1 This specification describes test films to be used for checking the focus of the scanning beam of 16-mm sound motion picture projectors.

2. Test Films

2.1 The test films shall have an originally recorded variable-density sound track, heavily overmodulated and developed to high contrast so that the resultant track is essentially a square-wave track.

2.1.1 The test films shall be of 2 types:
Type A—7000-cycle recording for manufacturing and precision adjustment of sound focusing;
Type B—5000-cycle recording for quick field adjustment of focusing.

2.2 The sound track shall have correct azimuth within ± 5 minutes of arc.

2.3 Each test film shall be provided with a suitable leader, title, and trailer.

2.4 The standard length of the test films shall be 100 feet.

Endless-Loop 16-mm

Health movies may soon be shown to patients waiting their turn in doctors' offices and clinics by means of automatically operating 16-mm projectors, if tests now under way at the University of Chicago work out. Ampro and Bell & Howell units are being tried in association with Triangle Repeater mechanisms that manipulate film as an endless loop, replaying itself indefinitely. Robert D. Hall, President of Commercial Picture Equipment, Inc., of Chicago, is working out the technical details. Since operation is automatic projectionists will not be needed as operators but if the practice becomes wide-spread technically skilled persons may be needed for repair and maintenance.

500 New 16-mm Titles Available

Five hundred new 16-mm films have been acquired by the American Museum of Natural History, New York, and are now available at nominal rental fees either in color or in black-and-white as preferred. Educational in nature, they cover such diverse fields as sports, business training, natural history, civics and vocational guidance. Catalogs can be obtained from the Museum's Film Division, 79th Street and Central Park West.

LETTERS

To the Editor of IP:

Dear friends "up over", your circular letter re my non-renewal of subscription found my face red—let me hasten to explain that we "down under" have our currency in pounds, shillings and pence Australian—and no dollars. My last subscription was paid through an agent, but since then we have had a law passed down on us—no dollars at all, not even for education — which your magazine definitely is.

I wish to thank you for the complimentary copy of IP which I have read and re-read, and also for the high standards which you maintain. It does our hearts good to see your magazine down here where "Simplex X-L" is something we have only read about. The latest Simplex in this country is the E-7. One of our own latest Australian-made jobs is the Raycophone CP7, which is classed as the job for the intermediate size show. Sound and projection heads are integrally housed, the soundhead being of the inverse scanning type with excellent performance. I installed one at the coalfield theatre of the leading electrical supply authority of this country, and it has just finished 2¼ years excellent service in very dusty and unsatisfactory projection surroundings.

Well, friends, if I get wound up I'll write all evening; as this is Sunday I think I'd better do the bankrupt exhibitor's act and close. I am in correspondence at present with your Australian representatives—McGills—and I feel certain that it only will be a matter of time until my luck is in again and my name back on your mailing lists.

ARTHUR T. CURTIS
Australia

To the Editor of IP:

I discovered a thin wire brush at Sears Roebuck which is the thickness of a splice and gives a wide brushing surface. At 25 cents it is well worth projectionists trying it. It works equally well with safety and nitrate bases and is easy to clean. I use it with a rotary motion that brings all the bristles into play. Some caution is necessary; too much of the base can be removed unless care is exercised. This item is not listed in the regular Sears, Roebuck & Co. catalog. I found it in their Fordham Road (Bronx, N. Y.) store. It is called "wire utility brush" number 3651; should any other readers wish to buy it I believe this identification will be adequate.

I would like to take this opportunity to tell you of the worth of "our" magazine. During this period of constant change and introduction of new ideas and equipment, I have never found myself at a loss to explain the whys and wherefores to other projectionists. To take just the recent issues, the series on the intermittent movement and the article on parallax barriers are illustrative of the above. The article on the new Eastman projectors was just so much "lagniappe"* as they say in New Orleans.

ALFRED E. REVZIN
New York City

* Louisiana French-Spanish word meaning for free, extra, the thirteenth roll the baker used to give you when you bought twelve.

To the Editor of IP:

The plastic reel can produced by the Eastman Kodak Company for 16-mm films, shown in *International Projectionist* for June, 1952, may be the first step in the solution of a lot of shipping prob-

lems. I hope the engineers of the Kodak Company will put their heads together and devise a plastic reel and can for 35-mm films. These would be much lighter than the heavy reels and containers now in use, would not bend, and would save the films from damage. Light cans of composition material are now in use for films which are shipped by plane. why not make all cans of plastic, and save metal for defense?

M. H. Winton
Kimball Theatre
Yonkers, N. Y.

To the Editor of IP:

I suggest that Hollywood place third dimension inserts in all releases from now on. These to run only a few minutes and be of important scenes only. The exhibitors would spend nothing except the price of the viewing spectacles. Cues telling the audience when to put on the spectacles could be inserted to show on the screen just before the third dimension appears.

This idea might save many houses now threatened with closing and many jobs. What do other projectionists think?

W. L. Malloy
Brandt Theatre
Harvey, Illinois

Takes Pictures in Darkness

An ultra-sensitive infrared motion picture film, that can take pictures in darkness or semi-darkness, has been announced by Eastman Kodak. It has been used successfully to photograph reactions of a theatre audience when houselights were dimmed to provide only one-seventieth of normal room illumination. Nature-film producers could use the new material to photograph wild animals at night without alarming them. Primary use of the film, however, is industrial, particularly in high-speed photography of flow or other action of hot or molten materials.

Audio "Fair" Oct. 29-Nov. 1

Audio Engineering Society's 1952 Convention and "Fair" will run four days, instead of three as in previous years. Dates are October 29 to November 1, inclusive, at the Hotel New Yorker, New York. Public address, recording, and other audio equipment will be on display. The exhibits this year will represent not only the latest products of American manufacturers but a number of European and Canadian models. By way of contrast visitors will also find on exhibition Edison cylinder-type phonographs, gooseneck loudspeakers of the 1920's and four-ounce magnetic phono pickups of the 1930's.

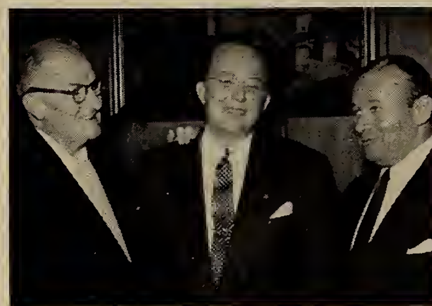
TESMA Show Bookings Boom

More than 75 exhibit booths for the TESMA-TEDA-ASA trade show and convention have already been booked. Roy Boomer, secretary of the Theatre Equipment and Supply Manufacturers Association, announces. A total of more than 150 exhibit booths are expected to be engaged by the time the trade show opens, November 15th, at the Morrison Hotel in Chicago. It will run through the 19th of that month. Allied States Association of Motion Picture Exhibitors and Theatre Equipment Dealers Association are participating with TESMA this year. TEDA has done so for many years past.

Among the 75 manufacturers who have thus far booked exhibit space are the following whose products are of direct interest to projectionists:

C. S. Ashcraft Mfg. Co., Automatic Devices Co., Ballantyne Co., Bausch and Lomb Optical Co., Century Projector Corp., Compco Corp., DeVry Corp., Garver Electric Co., General Precision Laboratories, Inc., GoldE Mfg. Co., Gordos Corp., Hertner Electric Co., Hewitt-Robbins, Inc., Hal I. Huff Mfg. Co., Hurley Screen Co., International Projector Co., Kollmorgan Optical Corp., LaVezzi Machine Corp., Lorraine Carbons, Inc., J. E. McAuley Mfg. Co., Motiograph, Inc., National Carbon Co., Neumade Products Corp., Oxford Electric Corp., Radio Corp. of America, Raytone Screen Co., J. E. Robin, Inc., B. F. Shearer Co., Strong Electric Corp., Superior Electric Co., Trad Television Corp., Vocalite Screen Co., Wenzel Projector Co., Whitney Blake Co., Edward H. Wolk Co.

CONFER ON COMING CONFERENCE



Guiding lights discuss forthcoming trade show. At left is Ray Colvin, president of Theatre Equipment Dealers Association (TEDA); center, Bob Hoff, president of Ballantyne Company, makers of projection and sound equipment, and president of the Theatre Equipment and Supply Manufacturers Association (TESMA). Right, is Jack Kirsch, president of Allied Theatres of Illinois. They are conferring on details of the joint trade show and convention to be staged by the three organizations in Chicago's Morrison Hotel, November 17-19.

LOCALS IN 16-MM WORK

(*Continued from page 22*)

There is no third place; or, rather, third place is roughly tie among Arizona, California, Colorado, Indiana, Iowa, Kansas, Maryland, Minnesota, Missouri, New Jersey, New Mexico, New York, Pennsylvania, Washington, West Virginia, and Wisconsin.

The above figures apply, of course, only to Locals involved; not to the amount of activity or amount of compensation earned. These latter data are not available; if they were, and were made the basis of comparison, unquestionably the geographic distribution of activity as set forth above would be drastically different. In any case, however, the figures show that IA locals are active in 16-mm work over the whole nation from coast to coast.

PERSONAL NOTES

Arthur C. Bryan is now vice president in charge of sales for National Carbon Company. He has been with the organization for 17 years and has been General Sales Manager since 1949. He is a graduate of University of Nebraska, with a degree in electrical engineering.

M. A. Maurer has been appointed to the post of plant manager of RCA's Detroit plant. He had previously been general foreman at the Camden plant. Maurer joined RCA-Victor in 1948 after ten years with Curtis-Wright Corporation, and advanced rapidly. The Detroit plant, which he will now manage, manufactures 35-mm projectors and arc lamps.

Adolph R. Schwartz has been transferred from equipment manager of Westrex Corporation to managing director of Westrex Australia, Pty, Ltd. He relieves W. S. Tower, who has been in Australia for four years and now returns to the U. S. for re-assignment.

Donald E. McConville is Eastman Kodak's new supervisor of industrial relations plans and procedures; Thomas H. Miller becomes assistant to the director of industrial relations; Howard L. Miller has been named general supervisor of wage and salary administration; Paul A. Gerhard is to be Howard Miller's assistant and Frank J. Fessenden is now assistant director of industrial training. Craig P. Cochrane, director of industrial relations, announced the appointments.

Charles C. Cater, III, audio-visual producer and author of many articles on audio-visual techniques, has accepted the post of educational coordinator of the Institute of Visual Training, New York, according to an announcement by William J. Ganz, head of William J. Ganz Company, with which the Institute is affiliated.

Eugene L. Schroeder has been named midwest district manager for Radiant Screen Company. Schroeder is the son of the former vice-president and sales manager of Victor Animatograph Corporation, and is an Air Force veteran of World War II. For the past six years he has been associated with the photographic department of Montgomery Ward.

SMPTE Convenes Oct. 6-10

Hotel Statler, Washington, D. C., October 6-10, are the place and time set for the 72nd semi-annual convention of the Society of Motion Picture and Television Engineers. Convention program chairman is J. E. Aiken, of Arlington, Virginia. Regional vice chairmen are: W. H. Rivers, Eastman Kodak, New York; George W. Colburn, Chicago; F. G. Albin, Station KECA-Tv, Hollywood, and G. G. Graham, National Film Board of Canada, Ottawa. Papers committee chairman is E. S. Seeley, Altec Service, New York. Convention vice president Bill Kunzmann visited Washington recently to make convention preparations and commitments.

THEATRE TV PROGRESS

(*Continued from page* 17)

telephone facilities for network connections. This situation has been a difficult road block. However, the telephone companies have shown increasing understanding of the needs of theatre television, and it is anticipated that AT&T will free more facilities for this service, thereby speeding the growth of the medium and increasing its own returns from it. In this direction, more reasonable charges per individual connection can be expected to be high on the agenda.

As a practical alternative to telephone line transmission, radio channels allocated for theatre Tv are currently under consideration by the FCC. It is expected that FCC will reschedule hearings soon.

Meanwhile the medium continues to move forward. Problems on the road to the future are being solved. Every month the number of theatre television installations increases, the reducing the cost factor per individual theatre. Valuable experience in boxoffice pricing has been gained. Programs are being formulated for production. Intercity and intracity telephone facilities will become increasingly available for theatre Tv programs at reasonable rates.

Theatre television will add fine entertainment of many kinds to its news and sports events. It will provide valuable services in the field of education and in specialized closed circuit services to government and industry.

The theatre needs television. The public has already shown that it will go for it. Slowly simmering during the past period, theatre television will erupt suddenly with its own formula for success in show business. The road may have obstacles, but the future is bright.

PSA Honors Kodak Men

The Photographic Society of America's 1952 Journal Award has been granted to Eastman Kodak's Dr. Lloyd A. Jones for "the most significant contribution published in the PSA Journal" during the preceding 12 months. Three other papers by Kodak scientists won honorable mention: one by R. B. Pontius; another by Louis B. Fortmiller and T. H. James, and one by John I. Crabtree, R. W. Henn and H. D. Russell.

Sound Equipment Show

Projectionists interested in the latest sound equipment and techniques will be among the throng at the fourth annual Audio Fair at the Hotel New Yorker, N. Y. C., October 29-November 1. Audio Engineering Society is the sponsor. An attendance of 15,000 is expected.

AMERICAN LABOR

(*Continued from page* 21)

Lloyd-La Follette Act, giving public employees the right of lobbying and affiliating with labor organizations; and, in 1916, enacted the Adamson Act, establishing a basic 8-hour workday for railroad workers engaged in interstate commerce.

Although the AFL under Samuel Gompers' leadership was successfully developing along the lines of "pure and simple" unionism, a series of unions, more or less revolutionary in character, rose to challenge it. These unions were committed to the doctrine that labor was engaged in a class struggle, and that a political offensive was the best way to advance the intereses of labor. On the other hand, the AFL championed the philosophy that gradual improvement of the economic condition of the worker was the only useful course of action to follow, and that collective bargaining was the chief tool to use. After a long struggle, which continued from the 1890's to the First World War, the philosophy of the AFL clearly emerged as the expressed views of the great majority of the country's organized workers.

Opposition to the strict trade-union policies of the AFL unions came from the Socialist Labor Party, the Socialist Party, and the Industrial Workers of the World. The Socialist Party, founded in 1874, was a product of the American section of Marx and Engel's International Workingman's Association, or "First International," formed in 1864. This group attempted in 1895 to form a rival body to the AFL—the Socialist Trades and Labor Alliance. Those within the SLP who believed in winning workers to socialist philosophy without resort to "dual union-

ism" broke away in 1901 and formed the Socialist Party whose members then sought, unsuccessfully, to change traditional AFL policies from within the federation.

The Industrial Workers of the World (IWW) was formed in 1905 by several dissident union and political groups. It was pledged to the "abolition of the wage system" and to the organization of the great mass of unskilled factory workers and of migratory or "casual" laborers. The IWW organized workers primarily on an industrial basis and was partly successful for a limited period in some areas throughout the country notably in the wheat fields, mines, and lumber camps of the West as well as in a few other scattered areas of industrial tension.

The militant tactics used to press its demands, particularly during the First World War, brought the IWW into public disfavor and caused several States to outlaw the organization. Many of its leaders were prosecuted and sentenced to long terms in prison. Once considered a possible contender to the AFL for supremacy in the labor movement, the IWW declined rapidly after 1913.

Labor and the First World War

During World War I, increased industrial activity and labor shortages brought a rapid expansion of unions. A National War Labor Board was created to promote union-management cooperation and to aid in the settlement of serious disputes which might interfere with the effective conduct of the war. For the first time in the history of the country, a Federal labor agency set forth the right of workers to organize in trade-unions and encouraged collective bargaining with employers through their chosen representatives.

In addition to serving on the National War Labor Board, representatives from organized labor participated on other Government boards and committees dealing with specialized war problems. Their cooperation with Government, on a scale theretofore unprecedented, secured for labor a hearing on specific complaints about industrial conditions as well as a voice in the determination of broad national issues.

Union membership increased in the mining and shipbuilding industries, and also on the railroads which were operated by the Federal Government during the war. Notable gains were made also in the packinghouse, textile, men's clothing, food and leather, and metal-trades industries. Large groups of semiskilled and unskilled workers were, for the first time, brought within the trade-union movement.

As a result of organizing activity in the favorable climate of Federal protection, union membership increased to more than 5 million by 1920.

More important than the numerical gain in union membership were the economic gains made by the workers, particularly during the years of, and immediately following, the First World War. Average hourly earnings in all manufacturing industry, which were about 15 cents in 1890, rose slowly to 22 cents in 1914, then jumped to 48 cents in 1919. In 1923, they were about 52 cents. At the same time, average hours worked per week in all manufacturing declined from more than 60 in 1890 to 49 in 1914. In 1923, the average workweek approximated 46 hours.

[TO BE CONTINUED]

GPEC Wins Government Contracts

General Precision Equipment Corporation and its subsidiaries have now been awarded government contracts for production of airborne electronic apparatus. International Projector Corporation (Simplex) and General Precision Laboratory, maker of large-screen theater television equipment, are among the subsidiary organizations. Others include Librascope, Inc., of Glendale, Calif.; Askania Regulator Company of Chicago and Kearfott Company, Inc., of Little Falls, N. Y. Backlog of government orders entrusted to General Precision Equipment subsidiaries is currently reported to be in excess of $110,000,000.

BOOKING 16-MM PRINTS

(*Continued from page* 23)

such listings as "Audio Visual Equipment" or "Projection Apparatus."

More difficult than locating prints which may possibly or probably fill an indicated need is arranging a booking to make sure they do. Especially if the film is to be obtained from a national source, such as its producer or prime distributor, the practicability of borrowing it for preview becomes dubious. Some national distributors have made such loans and still do, but the practice is obviously uneconomical.

Local rental and distributing agencies can more easily cooperate in this way, and may be more inclined to do so. But even they may be reluctant to lend the film twice in order to rent it once; and very reluctant to lend out ten films in order that a customer may select one for one paid showing.

The local Film Council, if there is one, is a help here. Some hundred or so of these Councils now exist; their central organization, the Film Council of America, hopes there soon will be thousands; there is no reason whatever why a professional projectionist should not take the lead in organizing a film council in his own community if there is none as yet. These Councils are composed of persons interested in use of 16-mm films —educators, religious leaders, industrialists, social service and other community leaders. They meet at predetermined times to look at 16-mm prints that may or may not be suitable to their respective needs. Film producers and distributors are more likely to make prints available free to such an association than to an individual, since the chance that a commercial rental or sale will result is multiplied by the number of members in the Council. Or if the desired film cannot be obtained under any circumstances without renting it, that trial-rental cost is shared among the Council members and not carried solely by one of them.

Terms and Conditions

The terms on which 16-mm films can be obtained vary from a purchase price of hundreds of dollars per picture downward through various lease and rental rates to a free loan. Shipping costs, and charges made for damage to the film while in the borrower's hands, also vary; some distributors have a minimum film damage charge which must be paid if the print is injured at all; some offer a "film damage insurance" through which this possible complication can be written off at a comparatively low cost. 16-mm prints suffer greater damage than theatre prints, because they are not always handled by trained projectionists, and the equipment on which they run is not always competently maintained. Distributors of 16-mm prints will benefit insofar as they are able to entrust their prints to professional projectionists who know how to take proper care of both film and equipment.

Stereospectacle Loss 1/500

Stereoprojection showings at the Festival of Britain, for which the audience wore polaroid spectacles, resulted in "loss" of one pair of spectacles per each 500 spectators, Raymond Spottiswoode reports in the British *Journal of Photography.*

ELECTRICAL INSTRUMENTS

(*Continued from page* 16)

dicates rms value. Most widely used a-c type for commercial and industrial service. Can be used for d-c if forward and reversed readings are taken, though usually is not so used since less accurate and less sensitive than moving coil type.

PRINCIPLE: Fixed field coils carry measured current; moving iron vanes or plungers attached to pointer system are attracted in proportion to current in coils. No inherent damping, so needs supplementary air or magnetic damping.

COILS: Can handle much higher current than moving coil instrument. Takes more power to operate since there is no permanent magnet and coil must supply energy

for magnetic field. Therefore, less sensitive.

CURRENT: Up to 100A in panel type, 200A in portable and 600A in switchboard types. Up to only 60A if multi-range switch is required.

VOLTAGE: Up to 750V with internal series resistor.

SCALE: Badly compressed at low end or fairly well distributed, dependent on construction.

ACCURACY: Susceptible to errors from high frequency and poor wave form due to eddy currents and hysteresis in moving iron parts. Less accurate than permanent magnet—moving coil type instrument. ± 1% instruments are typical.

VARIANTS: ATTRACTION TYPE, SOLENOID AND PLUNGER: Short scale. Simplest form. Used on inexpensive instruments.

ATTRACTION TYPE, MOVABLE-VANE: Good scale distribution.

ATTRACTION TYPE, THOMSON INCLINED COIL: Long, well distributed scale, good accuracy.

REPULSION TYPE: Substantially uniform scale.

REPULSION-ATTRACTION TYPE: With curved, wedge-shaped vanes. Long (240°) scale.

5. ELECTRODYNAMOMETER INSTRUMENTS:

USE: DC or AC at frequencies up to 2,500 cps if compensated. Indicates rms. Used for wattmeters.

PRINCIPLE: Interaction of magnetic fields caused by currents in stationary coil and in movable coil.

COILS: Usually not rated more than 100 ma because of small, low torque lead-in spirals. Sensitivity less than permanent magnet—moving coil instruments, but better than moving iron types.

CURRENT: Coils connected in series, sometimes with a shunt across the moving coil only.

VOLTAGE: Coils connected in series, used with series resistor.

POWER: Stationary coil in series with line and movable coil, in series with resistor, across line. All wattmeters are electrodynamometer instruments.

SCALE: Compressed low end.

ACCURACY: Less subject to wave form and frequency error than moving iron types. ± 0.1 and 0.25% accuracy is attainable for laboratory standards.

STEREOSOUND ENHANCES TV

(*Continued from page* 11)

quality between the Altec 800 and Altec Voice of the Theatre speakers. An existing telephone line between the studio and theatre, previously used for intercom purposes, was tested for use as one of the three connecting lines but could not be equalized to match exactly the characteristics of the two new telephone lines, and therefore three entirely new lines had to be used.

Extensive tests and gain checks preceded the actual showing. All three channels had to be equalized in both volume and frequency characteristics, and similarly equalization of the triple mixer control and microphone circuits was essential.

Finally, switching was supplied on the amplifier rack to provide for conventional projection of sound pictures (via regular soundheads and the center amplifier channel and center 800 speaker system) so the Little Theatre could return, after demonstrating Eidophor, to its normal function as a review room for Twentieth Century-Fox pictures.

HEART OF THE PROJECTOR MECHANISM

(*Continued from page* 8)

tent sprockets, especially on those older movements which have to be taken out of the mechanism for this operation.

Special care should be exercised not to deform the new sprocket (or the old one if it is to be reversed) or to spring, or bend, the star-wheel shaft on which the sprocket is placed. A slightly beat shaft or a lop-sided sprocket will cause a rapid jiggling of the picture (6 up-and-down movements per second). Patrons will certainly complain of this defect, even if the jiggling is too small in amplitude to be visible from the projection room without using opera glasses or binoculars.

Guard against dropping the movement or the star-wheel shaft and cover. *Do not* pound the pins from the old sprocket —use a pin-pusher. *Do not* pry the old sprocket from the star-wheel shaft with a screwdriver—use a sprocket-puller if the sprocket is stuck. Lacking a puller, soak the sprocket and shaft in a half-and-half mixture of gasoline and kerosene, and, wrapping the sprocket with a cloth, twist it off the shaft.

Do not file or sandpaper the shaft if the new sprocket goes on hard, and *never* pound the sprocket on with a hammer. Oil both the bore of the sprocket and the shaft, working the sprocket on with a twisting motion. And if at first you don't succeed, try, try again. You'll finally get it. To replace the pins, use a V-block held in a vise, and hammer the pins in *ever so gently!* Vigorous pounding may spring the shaft.

Elementary as the foregoing may seem to most projectionists, relief men often encounter positive evidence that some projectionist went at the job like a massive-muscled blacksmith. Speed should not be an object when replacing sprockets on the old-style intermittents —which means that every theatre should have a spare intermittent movement on hand.

The Future

And allow us to interpose our bewonderment at the fact that projector designers did not utilize a single-blade shutter revolving twice as fast as the double-blade shutter in order to obtain a more rapid and efficient light cutoff. It seems that even some of the most modern mechanisms reek faintly of the past.

What we *ought* to have, and *could* have, are *brighter* pictures, *bigger* pictures, *flickerless* pictures. Why do we not have these things *now?* Illuminated screen surrounds are a pathetically weak substitute for bigger, eye-filling screens. Larger screens are impractical without more uniform picture illumination. Better light over larger screens is useless unless peripheral flicker caused by the 48 cycles per second occulting shutter can be done away with. This is where the 5:1 intermittent movement comes in and the sluggish 3:1 intermittent goes out. Is a more rapid intermittent so unimportant?

[THE END]

BRITISH PLAN COURSE

(*Continued from page* 14)

attention to the requirements of the Satutory Regulations made under the Cinematograph Act, current regulations of the Cinematograph Act, IEE Regulations for the Electrical Equipment of Building, and so on.

Stage Equipment.—Fire curtains and associated equipment: sprinkler systems. Drapes, curtains and pelmets: tracks. Stage electrical equipment.

Heating and Ventilating. — Heating and ventilating systems in general use in kinemas, with description of typical installations: low-pressure hot water systems: boilers (solid fuel firing, oil firing and gas firing): heating batteries: gravity and accelerated systems: circulating pumps.

Types of fan (centrifugal and propeller): characteristics: applications: speeds: noise: mountings, speed regulation. Air cleaning equipment: filters: types and applications: air washers.

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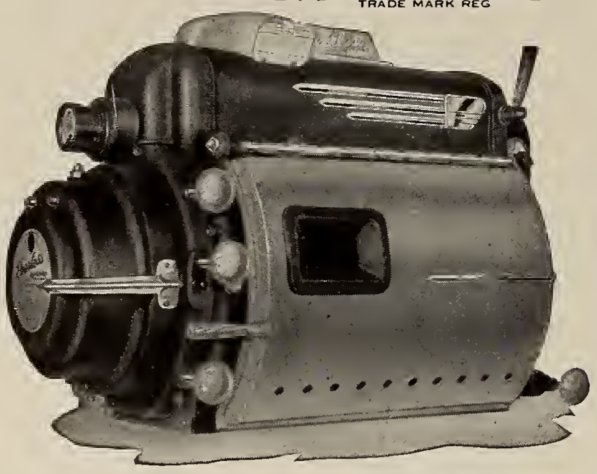

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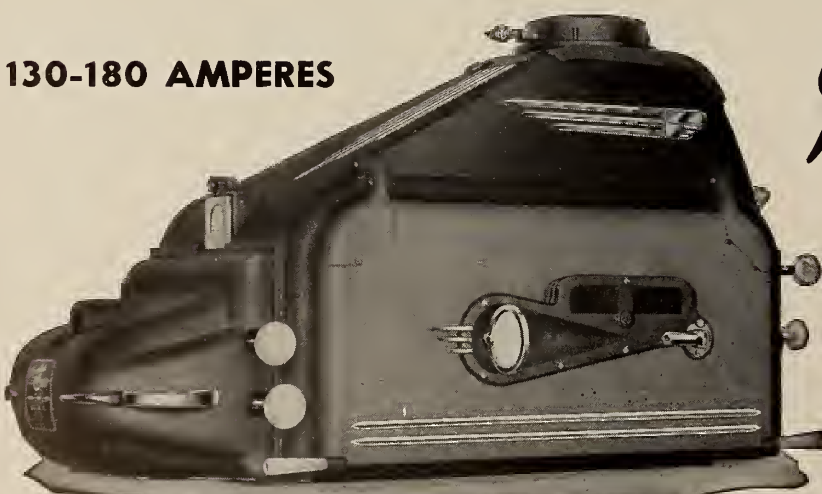

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AARON NADELL, *Editor*

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MONTHLY CHAT

A TURN for the better seems to have come to our industry, both business-wise and technically.

Business-wise, the customers are coming back. Theatres are earning more money than they did. So, also, are producers. For example: Universal reported this month consolidated net earnings of 1.7 million dollars for the preceding 39 weeks as against 1.1 millions during the same period last year. That's a 35 percent improvement.

The customers did not just drift back, they were brought back. Better product brought them back. The 'Movietime' units—stars and starlets touring the country, going out and talking to the people and making friends with the people, brought customers back.

Technically, the past few months have demonstrated a new awareness on the part of industry leaders of the importance of technology to their prosperity—an awareness this corner has been clamoring for for years. Either this voice in the wilderness has at last been heard, or the inevitable logic of the situation has brought the brass around to the position we have said all along they would have to occupy if they intended to survive.

At any rate, the summer of 1952 witnessed the highly impressive demonstration of Eidophor full-color theatre television (IP for July, page 14), with three-dimensional sound (IP for September, page 11); and of Cinerama panoramic cinema with three-dimensional sound (page 10 of this issue). Next month will see the commercial trial, in two California theatres, of polaroid-spectacle three-dimensional screen entertainment.

All this is to the good: business is better and did not get better of itself; the industry rolled up its sleeves and went to work and made it better. Technological improvements are being made, and their importance recognized at last by those whose recognition counts — the men who own the checkbooks. But—

What about the 3 or 4 or 5 thousand American theatres that still at this late date use low intensity projection? What about the 5 or 6 or 7 thousand that still bottle-neck the new entertainment through mechanisms 15 or 20 or 25 years old? What about the exhibitors who look forward to the silly hope that safety film will let them run with one-man projection rooms—and if the one man happens to be rewinding when the screen goes blank, let the screen stay blank, what do they care about their customers! What of these millstones round the neck of the industry?

Why, one of the great blessings of the recent, temporary, television-produced slump is that a lot of them were squeezed out. The type that did not want to meet union conditions for skilled labor, that did not want to replace obsolete equipment, failed to survive. Good riddance! May those of their ilk that still remain with us follow soon.

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VOLUME XXVII OCTOBER 1952 NUMBER 10

Theatre release prints on safety film stock are today an accomplished fact. A six-year span of consistently good performance has gained for this new film base widespread industry acceptance. Six years ago, in presenting the first authoritative series of technical articles on this film base, IP stated that projectionists were faced with a fact not a theory, and it added that the mark of true craftsmanship lies not in the medium employed but rather in the skill with which it is utilized. Safety film theatre release prints are here to stay, come what may, and it is in the best traditions of the projectionist craft that it use this film stock so as to achieve the best possible picture quality on the screen. This is no more or no less than an enlightened and an intelligent self-interest.—Editor

Safety Film: Performance Characteristics

By ROBERT A. MITCHELL

MANY projectionists still hold tenaciously to the contention that safety film, despite several years of satisfactory service, has no place in the motion-picture theatre, and that use of nitrate stock should be resumed for the printing of release positives, no matter which kind of film be used in the camera or for master positives and duplicate negatives. The reasons given in support of this contention boil down to various complaints anent ease of handling and splicing, and picture-quality on the theatre screen. All of these complaints are worthy of serious consideration.

The motion-picture industry has long sought a *safe* film. It is a quirk of fate that movies, until several years ago, have been made possible by running an explosively inflammable ribbon through an intensely hot beam of light. Such a condition as this has made projection a hazardous occupation.

Nitrate Film and Film Fire

Nitrate film is not safe even though it be left untouched in storage vaults. From the moment of its manufacture, nitrate film begins to decompose both chemically and physically. The insidious deterioration continues, hastened by repeated projections and improper storage conditions, until the film is no longer fit to use. Its kindling temperature, initially low, progressively decreases until the film is capable of *spontaneous* combustion during warm, dry weather. Can a blazing reel of nitrate film be extinguished? A carbon-dioxide extinguisher has a 50-50 chance because of the extreme coldness of CO_2 "snow"; but because nitrate film contains plenty of oxygen, in a loosely combined state with nitrogen, it can burn furiously even when submerged in water.

The writer would not lift a finger to attempt extinguishing a film fire. Close the ports, turn on the house lights, break the arc (if you get a chance), and take off. After the film has burned itself out, ventilate the projection room thoroughly before making a survey of the damage or cleaning up the projectors. Thankfully, we need this advice less and less as safety film displaces nitrate film. Safety film won't burn in a projector magazine. In fact, it is difficult to make it burn at all when rolled up on a reel.

All attempts to produce an acceptable safety film made prior to 1946 have been rejected by the trade because the safety films offered were physically unsatistory for machine processing and for repeated projections *via* arclamps of high power. These early safety films shrank, buckled, and wore out very quickly because of brittleness. Picture-quality on the screen accordingly failed to measure up to the high standards set by nitrate-film performance. Since picture-quality was, and still is, the vital consideration, not one of the early safety films was able, on its own merits, despite the absence of fire-hazard, to displace the dangerous and chemically unstable nitrate theatre-release positive film.

The Old (Diacetate) Safety Stock

Now what about the quality and properties of *modern* safety film, known as "triacetate" film, or, more correctly, as "high-acetyl" film? Is it satisfactory? Does it compare favorably with nitrate film in performance? Exactly what are the objections so many projectionists raise against it?

Considering the unhappy fate of earlier types of safety film, it would seem that we projectionists are judge and jury in the case of nitrate *vs.* high-acetyl safety film.

Picture-quality, we repeat, is still more important to the motion-picture industry than complete reduction of the risks involved in the manufacture and use of its photographic and sound records. Projectionists, acutely fire-conscious, feel the same way toward the matter. The points to be considered, therefore, are

Safety film identification: In addition to the words "Safety Film" there are *horizontal* identifying marks located every fourth sprocket hole within the row of sprocket holes along the non-sound edge of the film.

those raised by projectionists who still prefer nitrate to the latest high-acetyl safety film.

"Safety film becomes brittle and shrinks much more rapidly than nitrate film with repeated projections," volunteered a surprisingly large number of projectionists whom the writer considers as spokesmen for thousands of brother projectionists. These men added, in effect: "When safety film is accidentally pleated or crimped, the resulting creases can seldom be unfolded without breaking the film. Not so with nitrate film, which is sufficiently tough to withstand such misuse."

The writer could have gone all the way with these complaints had only the *earlier* types of safety film been meant. But having projected many reels of all types of film on many makes and models of projection machines, and recalling clearly the extreme brittleness encountered countless times with nitrate film, some of it fairly fresh stock, he began to wonder if projectionists who complained of shrinkage and brittleness had not subconsciously confused the properties of diacetate and acetopropionate safety film—(the earlier types)—with modern high-acetyl safety film. Because, actually, the new safety film shrinks very much less than the *best* nitrate film, and the new safety film does not become brittle in normal use.

The old diacetate (or "low-acetyl") safety film, by the way, was the first type of safety base manufactured by Eastman Kodak. Although acetylated to a slightly higher degree than the "normal" cellulose diacetate (about 34% acetyl) low-acetyl base (38.0% to 39.5% acetyl) is commonly called "diacetate" safety base. It was introduced by Eastman on a large scale in 1923 for 16-mm home-movie films.

Although it was occasionally used for non-professional 35-mm prints, diacetate film was definitely unsuitable for projection by powerful arcs in theatres. It shrank and buckled excessively and became frame-embossed and brittle after only a few runs. Not only that, but it also gave trouble when machine-processed because it swelled rapidly in contact with water, resulting in slack loops, and quickly shrank as it passed over the rollers of the drying cabinets, resulting in tautness and subsequent permanent deformation of the film.

Only the acetates, propionates, and butyrates of cellulose are of practical use as *plastics*—and these and other kinds of relatively non-inflammable plastics have almost completely replaced the cellulose nitrates (cellulose esters of nitric acid) from which the dangerous nitrate motion-picture films and other "celluloid" articles of yesteryear were made.

Cellulose acetate is a cellulose ester of acetic acid alone, and cellulose propionate is a cellulose ester of propionic acid alone; *but cellulose acetopropionate is a mixed cellulose ester of both acetic and propionic acids.*

Acetopropionate safety film was found to be much superior to the older diacetate film. In fact, it was about midway between diacetate and nitrate film in most of its physical properties. Although used successfully during the second world war for service showings, and for all 16 and 8-mm subjects, the few short subjects on acetopropionate base released to the theatres proved that it was unsatisfactory for professional use. It shrank, became brittle, the perforations tore out easily; buckling, focus-drift, and other in-and-out of focus effects were of a large magnitude.

So acetopropionate was out for 35-mm filming. But continued research in the safety-film field resulted in a number of experimental films. Of these Eastman chose the high-acetyl (triacetate) film as being best suited for professional use at the present time, and the most like nitrate in physical properties.

Modern (High-Acetyl) Safety Stock

High-acetyl film was introduced to the trade on an exploratory basis in 1946; and in 1947 it began to be used extensively as a replacement for standard 35-mm release positive stock. The "duplitized" Trucolor prints released by Republic Pictures were noteworthy as the trade tests which "sold" the industry on the new safety base as soon as its performance-characteristics, first determined by extensive laboratory testing, were verified in the field.

The Trucolor trade tests were especially severe, since Trucolor, like other double-coated color positives, nearly doubles the difficulty of splicing. Not only must the blue emulsion on the normal emulsion side of the film be scraped off one stub, but the red-orange emulsion on the reverse side must be scraped from the other stub in order to obtain two film-base surfaces which face each other in making the splice.

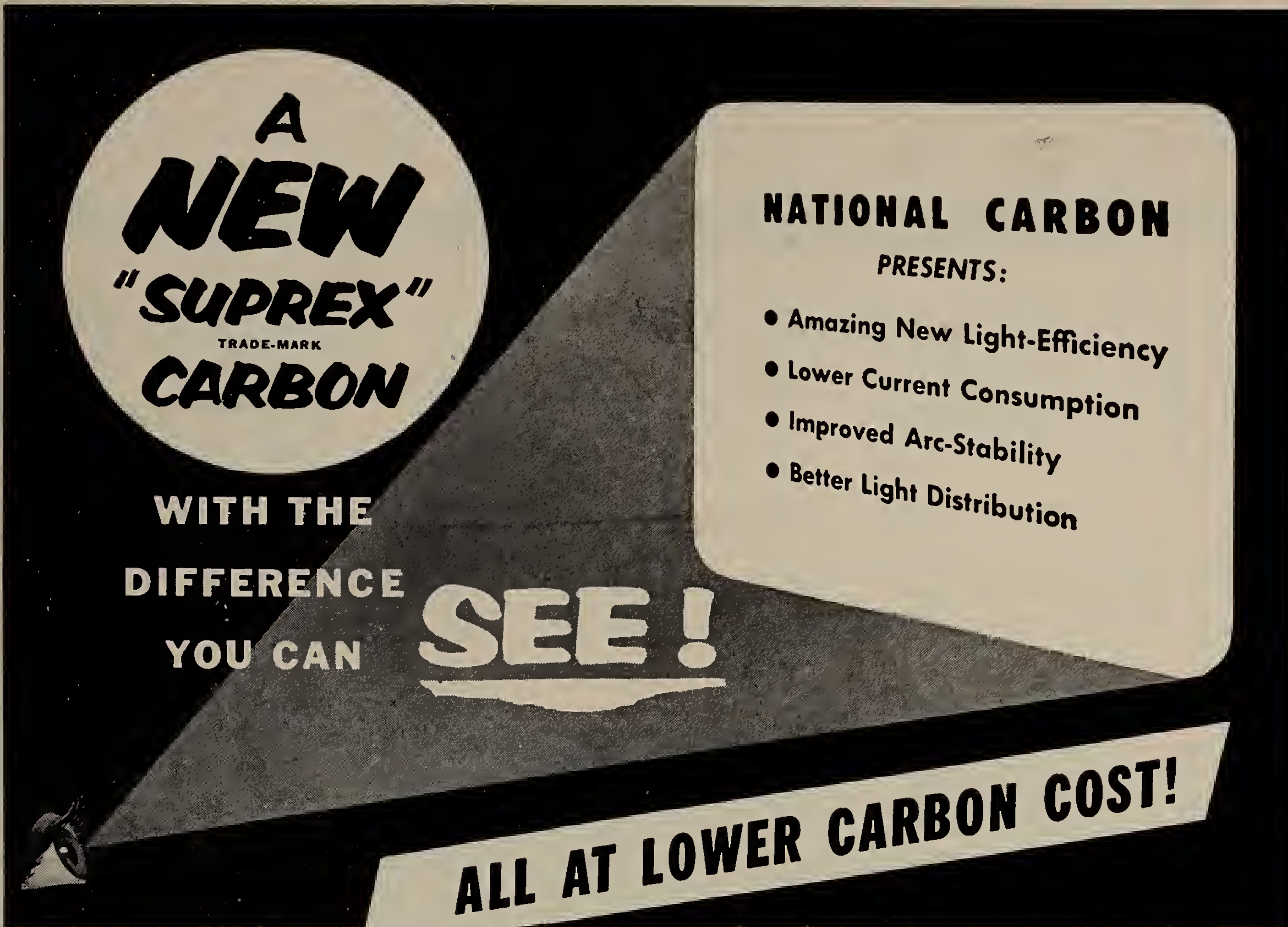
Projectionist resentment against the new film was immediately evident. Some complained they could not focus it clearly, blaming this defect on the film base, when actually the duplitized nature of the photographic images was at fault. If a good focus cannot be obtained with Trucolor, Cinecolor, Supercinecolor, Magnacolor, *etc.*, it is simply because it is impossible to bring *both* sides of the film to a focus on the screen. The best that can be done with 2-color duplitized prints is to bring the blue or cyan image to a focus; with 3-color duplitized prints, the magenta image.

Especially annoying, however, were the black-and-white "sneak" tests, wherein black-and-white films were handed to the projectionist without adequate instructions for splicing them, or even furnishing cements which would "take" on high-acetyl base.

For example, one of the earliest trade tests consisted of features, the first two reels of which were printed on one kind of stock, the next two on the other, *etc.* While tests such as these verified the serviceability of high-acetyl film, they also gave the projectionist a slap in the face which he could hardly be expected to appreciate.

From the raw-stock manufacturer's point of view, "sneak" tests were nevertheless necessary to reveal any defects which might turn up under actual theatre usage. Happily, safety film held up remarkably well in comparison with nitrate stock, and was even superior to the latter in several important respects. But breaks in the show, due to *safety*

Nitrate film identification: In addition to the words "Nitrate Film" there are *vertical* identifying marks located every fourth sprocket hole in the region between the sprocket holes and film edge.



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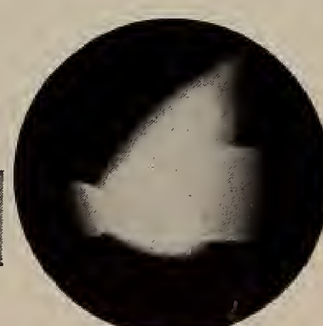
AND THAT'S NOT ALL! With an optimum current range of 65-75 amperes, the new 9 mm "Suprex" carbon and the 8 mm "Orotip" C negative carbon can be substituted directly for the 8 mm-7 mm carbon trim up to 70 amperes*. Merely install appropriate holders and guides in your present equipment and get:

- More light at slightly increased current
- Equal light at same current
- Lower carbon consumption and cost
- Better light distribution at all currents

*Above 70 amperes, see your theatre supply dealer for his equipment recommendations.



BUY WISE—DEMAND TO SEE THE DIFFERENCE!

The terms "Suprex" and "Orotip" are trade-marks of Union Carbide and Carbon Corporation

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did not help either the theatres or the projectionists.

High-acetyl base contains from 42.5% to 44.0% acetyl, and is thus not quite so highly acetylated as the "normal" triacetate (44.8% acetyl). And herein lies one of the secrets of the success of the new safety film. Because it is slightly less acetylated than the highest degree of acetylation possible, it is very much more readily attacked by suitable solvent liquids and accordingly is easily cast into the form of film by the manufacturer and is easily spliced by projectionists and exchanges *when properly compounded film cements are used!*

The physical characteristics of high-acetyl safety film are now very well known. They resemble those of nitrate film very closely, except that its tear-strength and rigidity are slightly lower. But safety film doesn't buckle as badly as nitrate film: it retains its original flexibility and shrinks comparatively little. It doesn't become brittle rapidly like nitrate, hence is superior for super-high-intensity projection. And old safety print gives a better picture on the screen than an equally old nitrate print *because safety film retains most of its original qualities.* Safety film, unlike nitrate film, is permanent in storage and doesn't burn any better than wet paper. This is a far different story than could be written about the earlier types of safety film.

Characteristics of High Acetyl Stock

Now to offer a few more words about the alleged shrinkage and brittleness of high-acetyl safety film about which projectionists have been complaining.

Nitrate film of good quality may lose up to about 0.7% of its length through shrinkage. Older types of nitrate film could lose up to nearly 2.0%, and actually tear on the sprockets. The shrinkage of nitrate film is seldom uniform: it varies from foot to foot. The pitch of the sprocket-holes varies accordingly, causing a vertical weaving of the picture and, in moderately severe cases, a tearing sound at the intermittent sprocket. If a vertically-weaving picture is obtained with a safety-film print, it is only because the picture was printed from shrunken *nitrate* negatives. This is frequently the case with reissues of *old pictures printed on fresh safety stock.*

Under average conditions, a high-acetyl safety print seldom shrinks more than 0.15% after about 300 runs; while a nitrate print shrinks about 0.35%—more than twice as much—after the same number of runs. After approximately 300 runs, safety and nitrate films have about the same degree of brittleness. Does this mean that safety film is no better than nitrate film in regard to brittleness? Not at all. If both types of film were given even a fewer number of runs on equipment employing the highest-powered arcs, it would undoubtedly be found that safety would be appreciably less brittle than nitrate.

The second and concluding article on the performance of safety film stock will be published in the next issue of IP. It would be particularly helpful to the craft at large if there could be appended thereto a summary of projectionist opinion based on actual operating experience with this film stock. Such opinion is earnestly solicited.

Nitrate has a slightly higher degree of flexibility when both types of film are fresh, but nitrate loses its flexibility, rapidly becoming brittle with both use and age, *while safety film retains most of its original flexibility.* (In certain cases the writer has observed that comparatively fresh nitrate stock is unduly brittle, fracturing when creased.)

Some Projectionist Complaints

The matter of film-buckling has elicited complaints aimed at safety film. In order to convince the writer that modern safety stock buckled more badly than nitrate stock, several of the projectionists interviewed directed attention to the "waviness" often seen in the turns of film in large rolls of safety film.

One projectionist emphasized this point by removing two reels of film from the film-cabinet, one safety and the other nitrate. The convolutions of the 2,000-foot roll of safety film were wavy, and the outside turn was definitely buckled in appearance. The layers in the 2,000-foot roll of nitrate film were perfectly circular to the eye, and lay flat and smooth on the reel.

Unwinding a few feet from each reel, the writer noticed that the safety film was pliant and tough, and possessed a curliness that looked very much like severe buckling. Gentle stretching of the safety film, however, instantly brought it out reasonably flat with only a slight negative curl (emulsion side convex, base side concave) and without any trace of actual buckle.

The nitrate film, on the other hand, had a stubborn curl that mild tension could not remove without a slight fluting or waviness of the edges of the film—even though the film looked perfect wound tightly on the reel. The curliness in this case was due in some measure to slight buckling, the defect which was suspected in the safety film! Any projectionist can make tests like these for himself.

Also noticeable in the nitrate print was pronounced frame-embossing, due, of course, to the large number of projections it had undergone. The nitrate print was the older of the two films. It is of interest to note, however, that even though frame-embossing is not deleterious to satisfactory projection providing that the embossing is uniform in degree throughout the entire reel of film, *safety film is markedly less subject to embossing than is nitrate film.*

Returning to the subject of the wavy appearance of some rolls of safety film, even when the film is quite new, Mr. W. I. Kisner of Eastman Kodak comments:

> "Of the complaints of this nature on high-acetyl safety film which we have investigated, we have found no case which was so serious as to cause projection difficulties."

This comment is significant to the writer because it lends the strongest support to the conclusions reached by personal experience, namely, that the waviness of the safety film does not affect focus on the screen. Both Mr. Kisner's statement and the writer's experience are further substantiated by an opinion, based upon extensive research, expressed earlier by Dr. F. J. Kolb, Jr., of the Eastman research staff:*

> "It has been shown that film in the aperture is almost never flat, and that its position bears no relationship to the curl of the film-loops or other shapes the film may assume either entering the top of the projector gate or leaving the bottom of the gate.
>
> "Film in the aperture under the influence of the light-beam," added Dr. Kolb, "behaves as though the emulsion surface were expanding with reference to the base dimension, so that each frame is distorted into a pincushion shape with the emulsion surface on the convex side: since the edges are held, the center of the frame is displaced toward the arc. *This is a perfectly normal phenomenon occurring in all cine projection.*"

Dr. Kolb points out additionally, that if the film is threaded up so that the emulsion faces the projection lens, the same expansion of the emulsion-side occurs, in this case with the center of the frame displaced toward the screen. The conditions prevailing in standard projection, with the emulsion-side facing the lamp, are, however, more satisfactory optically, permitting a clearer over-all focus on the screen.

The writer's most recent experience in theatres, operating on different makes and models of projectors under diverse conditions, provided convincing evidence

(*Continued on page* 29)

*** "Air Cooling of Motion Picture Film for Higher Screen Illumination" by F. J. Kolb, Jr., IP for January 1950, p. 10, col. 2. A liberty has been taken with the first quotation in order to make clearer Dr. Kolb's meaning.**

Cinerama is presented to the people and they love it! It utilizes three projection rooms, superb third-dimensional sound, and splendid Technicolor. A merged panoramic presentation curves through an arc of 146 degrees. Straight lines come out bent; imperfect merging of the frames makes sky-scrapers jig and mountains dance; viewing key-stone in side seats is monstrous! But they buy out the box-office at advanced rates, applaud thunderously, and tell each other it's wonderful!

CINERAMA—A Step in the Right Direction

By AARON NADELL

UNVEILED in New York on September 30th with a glare of publicity and glamor, Cinerama demonstrated beyond shadow of doubt that the public wants something new and different technically, will crowd to it, and pay for it gladly. The matinee of October 1st, the first commercial performance of Cinerama, played to an SRO audience at admissions of $1.20 to $1.50, and was welcomed with salvos of applause.

Cinerama is probably not the boon and savior the industry has been awaiting, but it does seem to prove that salvation can be found in technological advancement; and in addition it will quite likely earn large sums of money for its promoters as a big-city, State Fair and road-show novelty. In those applications it should also provide substantial employment opportunities to the projection craft, since it requires not less than *three* projection rooms! (In the New York showings they are using four, but these are still on a more or less experimental basis.)

The expressed theory behind the new method is that "peripheral vision"—seeing out of the corners of one's eyes—creates illusions both of third dimension and of realism in general. To achieve this effect, a cycloramic screen is used, so that members of the audience, in forward seats at least, have a motion picture substantially on three sides of them, and do see parts of it out of the corners of their eyes, almost as fully as in real life. The immense curvature of the screen—146 degrees, not much less than a half circle—makes necessary triple projection. or presentation of the picture in three panels. These are joined seamlessly (that is the intention, not always maintained) to form one vast, sweeping panorama.

The effect, as viewed for the first time and with suitable program material, is startling. IP reported upon a laboratory presentation in November, 1950, (page 10): "So intense is the feeling of realism transmitted by Cinerama that not a few viewers are overcome physically—the genteel term is 'nausea' or 'seasick'—and are compelled to leave the auditorium hasily."

This extreme result was not repeated at the October 1st matinee, but the audience was decidedly "overcome" with excitement; whistling, whooping and ultimately applauding at the opening sequence in which they seemed to be actually riding in a seaside roller coaster, looking out over the ocean, swaying and turning, climbing, and swooping in spine-tingling descent. The effect produced was not that of seeing a movie, but of being there in the darting, rocking car. The shoulders of some members of the audience could be observed to sway with the motion of a car they were not riding but felt they were. Subsequent scenes did not always reproduce the same intense realism.

Public reaction at that first of all commercial showings was enthusiastic not only in applause, but also in conversations overheard during the intermission. They thought it was "great."

One advantage that helped produce this impression was Technicolor of marvelous quality. Another was three-dimensional sound better than ever heard in any movie theatre. During the *Aida* presentation, for example, one could close one's eyes and almost imagine that the orchestra was actually a living operatic orchestra—almost, that is, nearly but not quite altogether; something indefinable and slight was still missing. But of what other mechanized sound can one say as much? Coming from six different speaker systems, this sound seemed to be always at least quasi-binaural in quality; and at times it followed the action across the screen or swooped round the sides and rear of the auditorium in true stereo reproduction. Much of the uncritical audience's enthusiastic acceptance of Cinerama must be credited to truly splendid color and sound.

But if they liked it so well, what's wrong with it, if anything?

Plenty is wrong with it that uncritical eyes would not notice at first, but will waken to slowly when the novelty wears off. That no doubt is why its sponsors extended their premiere invitations to personalities who would be impressed and give Cinerama favorable publicity, but not so freely to technical people. For example: Maggi McNellis, radio commentator, interrupted her September 30th description of Fall styles in

The Cinerama screen is built up like a venetian blind with vertical slats made af a plastic tape. There are 1100 strips in all. Sound transmission takes place through the slots between them. From the rear, as shown in this picture, the screen is at certain angles fairly translucent, but from audience point of view appears absalutely solid.

ladies' hats to announce her invitation to see Cinerama—but no invitations were sent to the Society of Motion Picture and Television Engineers. (Nor have Cinerama's sponsors ever accepted repeated invitations to present a paper on it before the Society.)

What's Wrong with Cinerama?

There are at least eight major technical flaws in the Cinerama process, none of which admits of ready or easy remedy, and all of which were glaringly visible even at the first commercial performance when equipment was still factory-new, and operation supervised by inventors and engineers in addition to projectionists.

1. Horizontal lines are seldom straight. (They are projected onto a curved screen, which curves them.) The pretzel-like effect on railroad tracks was almost grotesque. Funny, or perhaps unfunny in so serious and earnest a project, was the unhorizontal sea-horizon in the roller coaster sequence; for, while the car was rising toward the top the horizon line was a smiling mouth, corners curving up; but when the car reversed and started downward the horizon also reversed and became disconsolate, corners down. The same inevitable, unavoidable effect was also visible in other sequences, but railroad and horizon lines showed it most clearly. If Columbus had had Cinerama instead of only an egg he would have had no trouble at all proving the earth is round—one look at the horizon in the Aquacade sequence would have been proof plenty.

2. The joins between the three component panels (frames) are not always as perfect as desired; vertical junction areas often show plainly.

3. Projector jump (vertical vibration) of the three projectors is not in synchronism. For example, during the solemn singing of *Abide With Me* one of the massive church columns was partly in one panel and partly in the other; and these two half-columns vibrated against each other, completely destroying the impressiveness of the effect, at least to one observer.

4. When one of the three projectors gets out of frame and needs to be reframed with respect to the others, illusion again is ruined.

5. The projection light on the three panels is often unmatched as to both brightness and color tone. The lagoon of Venice seemed at times to be composed of water of three different colors. And in the Edinburgh sequence the white-faced Scotch bagpiper who marched across the screen from one panel to another instantly became sunburned!

6. Whenever horizontal lines stretch across the screen so far as to pass from one panel into another and the camera is panned, a jiggle appear at the narrow area of junction. This, in combination with the projector jump mentioned above, produces some really grotesque effects. Queerest was in the airplane sequence when Lowell Thomas proclaimed: "Nobody ever saw Manhattan Island like this before." He was quite right: nobody ever saw the Empire State Building doing a jig before. Later on in the same airplane sequence the Sierre Nevada mountains danced.

7. Keystone distortion in viewing: it is obvious that to a person sitting at either side of the theatre there must be keystone distortion of all objects appearing at the same side of the screen, because that side of the screen curves toward him. This was especially visible in a choral number; the chorus divides into two groups which take up their places at opposite ends of the scene. The group appearing at the far side of the screen looked normal to an observer in a side seat; but the group at the near side looked thin as matchsticks.

8. The peripheral vision advantage claimed for Cinerama applies most effectively to those seated up front; and becomes progressively less toward the rear of the theatre. The Broadway Theatre, New York, in which these first commercial showings are held, is an old legitimate house essentially square in shape; in a longer and narrower auditorium only a relatively small percentage of the audience would be exposed to the full effect of Cinerama.

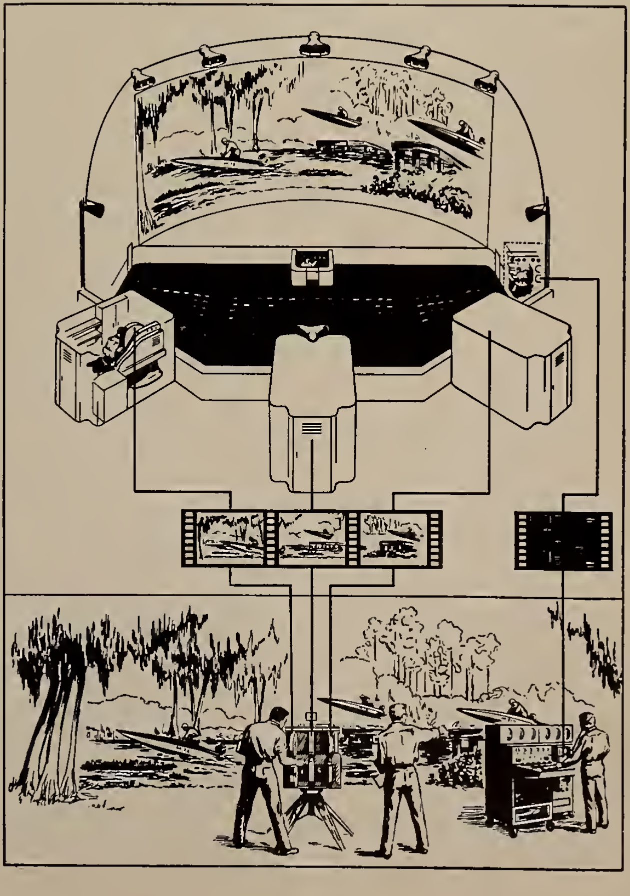
And technically unskilled reviewers, reporting the premiere in the New York daily press, though apparently they did not note all the mechanical flaws, did comment on some; and also noted that the presentation offered only spectacular scenes, no dramatic or emotional ones.

How It Works

How it works, in general, is illustrated here by the artist's sketch. At bottom is shown the process of making the film. The camera, at bottom center, carries three reels of 35-mm film that run simultaneously and in synchronism with each other. Three camera lenses are set to point 48 degrees apart. In consequence, the scene before the camera is photographed in three parts over a visual field extending through 146 horizontal degrees. The vertical field covered is 55 degrees.

At right, in the lower panel, is the sound recording control unit. This is wired to seven microphones and records seven soundtracks on a separate 35-mm film. Six of these tracks are derived from microphones spacially distributed to correspond with the three separate picture films; the seventh track is associated with an "over-all" microphone placed for general coverage of the entire panoramic area—this is the emergency track, to be used only in event

(*Continued on page* 24)



How it works is indicated in this artist's sketch. At bottom, center, triplex camera produces three independent 35-mm films; at bottom, right, 7-microphone control console records 7 soundtracks on 35-mm film (one track for emergencies only). Three picture films are played through three projectors located in three separate projection rooms. Three merged images appear on the curving screen. The six soundtracks produce stereophonic sound through six speaker systems.

Theatre Tv Grosses $400,000 Showing Marciano-Walcott Bout

Estimated 125,000 patrons in 50 theatres from coast to coast witness match by video. Drive-in shows it 36 feet wide at $10 per car and rents radio time to apologize for turning away the thousands that could not be accommodated.

THEATRE television in its most extensive network to date brought the Marciano-Walcott engagement, staged in Philadelphia on September 23rd, to over one hundred thousand spectators at a gross revenue of nearly half a million dollars, and turned away at the lowest estimate tens of thousands more who would have been glad to buy tickets at the advanced rates charged. On the average, according to best available estimates, the theatres showing the program charged and got $3.50 per admission.

Several theatre Tv records were broken. Attendance and grosses were the largest to date. The first drive-in Tv showing in the world was part of the event, and patrons there saw the largest Tv image ever created—36 feet wide; and the longest Tv projection throw—125 feet.

A coast-to-coast theatre video network was created for the first time. New York and Los Angeles, Miami and Seattle, Pittsburgh, Indianapolis, Louisville, Chicago, Minneapolis, and Denver were among the 30 cities where the program was available. Seven theatres presented it in New York, and three in Chicago. One mechanical failure was reported, in New York. The management refunded approximately $13,000.

Outstanding experience, perhaps, was the drive-in Tv showing, the projector for which is pictured on this page. The theatre, owned by Smith Management Company of Boston, is located in Rutherford, N. J., on Route S-3, and named the S-3 Drive-In. It normally accommodates 1,300 cars at ordinary drive-in rates; but on the night of September 23rd charged $10 per car (no limit to the number of passengers) and $2.50 apiece to walk-ins. The latter numbered 1,200. Thus, the gross revenue at the S-3 was $16,000 on that evening. If S-3 could do as well every night it would gross $16,000 x 365 or $5,840,000 per year!

The management of the S-3 Drive-In rented time over radio station WPAT, Paterson, N. J., to apologize to all who wanted to attend but could not be accommodated; and perhaps apologized also to local and State police for the tremendous traffic tie-up, many miles long, created by the thousands who drove out hoping in vain to be admitted.

Image quality at the S-3 was reported excellent; reception was from the Tv antenna atop the Empire State Building, New York City, which is only a few miles distant by air; and reproduction by RCA PT-100A instantaneous theatre equipment.

Of the 50 theatres carrying the event, 37 were RCA-equipped. Paramount film-intermediate apparatus recorded the program on 35-mm film. A number of theatres bought Tv equipment specifically in time for the occasion. Milton Schwaber's new Met Theatre in Baltimore, Md. installed a Motiograph-Trad dual channel system under the guidance of Henry C. Dusman of Baltimore's J. F. Dusman Co. And at the opposite end of the country, B. F. Shearer Co.'s Homer Tegtmeier similarly equipped San Francisco's Telenews Theatre. Victor Trad, president of the Trad Television Corp., personally supervised the Telenews installation.

A number of the houses carrying the Marciano-Walcott program offered motion pictures also. In some cases double features were shown, one before the main event and another after it. Other exhibitors, however, offered nothing but the telecast from Philadelphia in return for their average $3.50 admission.

Resentment was reported from Boston and other New England areas because the contest was not made available there on theatre or any other Tv in spite of the fact that it was on view in theatres in communities much closer to Philadelphia—New York specifically, and also Asbury Park, N. J., and others. Over large areas of the South and Southwest the program could not be shown because of limited transmission facilities. And in Philadelphia itself and regions reasonably adjacent, including Atlantic City, no theatre showings were permitted.

Most of the theatres that booked the telecast reported SRO or overflow audiences; at the S-3 Drive-In it is estimated that no less than 5,000 would-be customers were turned away. The true

(*Continued on page 27*)

Mobile "projection room" housing Tv equipment porks 125 feet from screen of New Jersey drive-in to reproduce the motch for copocity-plus oudience. Regulor projection room is identified by projection ond viewing ports on structure in the bockground.


A star's best friend...
Pictures take months to make . . . may be *unmade* in split seconds.
For the superlative showings of which modern projection equipment is capable depend upon superlative film care.
Film coating, for example, lubrication, and inspection—all require precise knowledge, expert handling. And in cleaning, splicing, and winding, the film must be held "just so" in hands wearing the right type of glove; here, the slightest scratch means trouble.
On subjects such as these—ranging from choice of film to projection and film storage—representatives of the Eastman Technical Service for Motion Picture Film are trained to advise and work with the industry.
To maintain this service, the Eastman Kodak Company has branches at strategic centers . . . invites inquiry on all phases of film use from all members of the industry. Address: Motion Picture Film Department, **Eastman Kodak Company,** Rochester 4, N. Y. *East Coast Division,* 342 Madison Avenue, New York 17, N. Y. *Midwest Division,* 137 North Wabash Avenue, Chicago 2, Illinois. *West Coast Division,* 6706 Santa Monica Blvd., Hollywood 38, California.

Modulated Air Blast for Reducing Film Buckle†

By WILLY BORBERG
General Precision Laboratory, Pleasantville, N. Y.

Present-day demands for high-intensity light sources point up the need for a suitable technique for reduction of excessive film buckle. This article shows why modulated air blast is to be preferred over continuous air blast. It presents experimentally obtained data regarding buckle magnitudes in 35-mm film.

THE type of buckle with which we are concerned in the present discussion is a deformation which takes place during the frame cycle while the film is in the aperture. It may leave no record of its existence on the film after projection. It can be made visible by stroboscopic or high-speed photographic techniques, appearing as a rythmic—almost breathing—motion of the film surface in the aperture. It produces deterioration of image focus during part of the rapidly recurring projection cycle.

Each single picture frame goes through a cycle which starts with pulldown into the aperture, proceeds through the first exposure, the flicker blade cutoff and the second exposure, and ends with the pulldown of the next frame. During the two exposure intervals the film arrests some of the radiant energy from the light source and transforms it into heat. This causes the film to buckle (or bulge) in a manner very similar to that observed in the operation of a bimetallic element. The emulsion, being more opaque than the base, absorbs energy, expands and becomes the outer or convex surface of the bulge. The magnitude of the deformation produced varies continuously during the frame cycle and by an amount which is more than sufficient to affect sharpness of image focus.

The emulsion side of 35-mm film is toward the light source; and hence the film tends to move toward the light, away from the lens, while it is in the aperture.

In accordance with the accepted terminology, the deformation is called *negative* when the emulsion side is convex, and conversely, *positive* when the emulsion side is concave. Flat film is considered to have *zero* deformation.

The film upon entering the projector gate is not necessarily flat, but may have a slightly positive curl, the magnitude of which depends to some extent on the age and condition of the film. It appears that there is some shrinkage of both emulsion and base, the emulsion shrinking more than the base, so that the resulting curl is slightly positive. Typical positive displacement at the center of cold 35-mm film as it enters the gate is between zero and 0.010 in.

How Film Buckles

Instantly upon registration of the film frame with the aperture, the shutter uncovers the light for the first exposure of the cycle. Light energy is absorbed in the emulsion and transformed into heat. The expanding emulsion causes the exposed portion of the film frame to move from its initial zero or positive position, shifting it to a negative position, and causing it to take a somewhat spherical shape.

There is a constantly increasing deformation during the first exposure, and a constantly changing distance of the emulsion surface with respect to the lens. Upon interception of the light by the flicker blade, further movement of the film surface toward the light source comes to a halt. With no light on the film, heat absorption by the film cannot take place. Instead, there is a loss of heat which causes the film to recede slightly toward the zero plane.

At the start of the second exposure, the film surface stands somewhat between zero and its former maximum negative position. During the second exposure, the film continues its excursion negatively, first rapidly, then leveling off. At the end of this exposure the film reaches a more negative position than at the end of the first exposure.

How Buckle Impairs Focus

Figure 1 shows the correlation between the movement at the center of the film surface and particular instants in the frame cycle. The same movement occurs at points off the center of the film surface, though to a smaller degree. A significant effect which may be noted is that the center of the film, which is in motion during the entire cycle, travels through and beyond the acceptable focus limits defined by the depth of the focus of the projection lens.

The projectionist, whose eye cannot follow this rapid sequence of events (48 times per second), has to pick a "best average focus" position of the projection lens, somewhere between the maximum positive and maximum negative of the two exposure periods. If he judges the focus at the center of the screen, he picks a "best average focus" position near the maximum negative buckle of the first exposure. The remaining, earlier part of this exposure produces only a poor and undefined image on the screen.

A portion of the second exposure, also, is beyond the limit of good image defini-

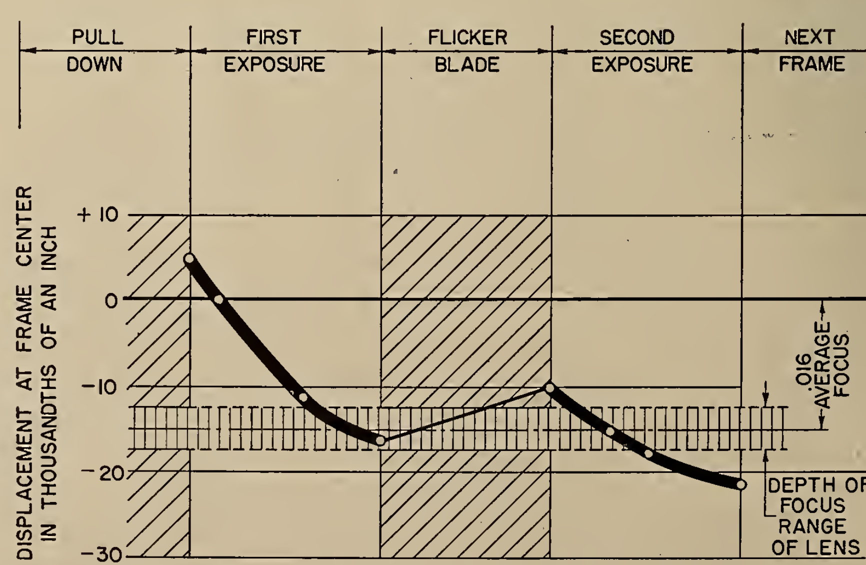


FIG. 1. Film displacement due to buckling at center of frame—no air.

†Cond. from Jour. SMPTE, Aug. 1952.

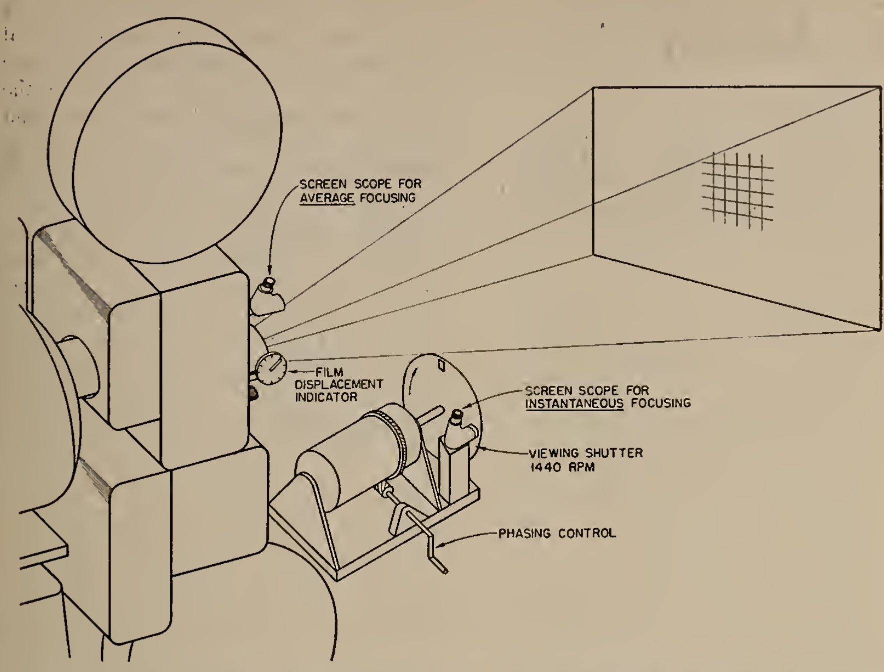


FIG. 2. Test equipment used to determine film buckle magnitudes and time relations.

successive phases of the cyclicly varying film frame motion (see Figure 2). The viewing shutter's drive-motor stator was rotable so that the shutter opening of about 9° could be phased with relation to the synchronously running projector.

This stroboscopic arrangement made it possible to view the screen image in small time increments of about 1 msec through all exposure phases of successive frame cycles. The film emulsion position during any specific phase of the exposure periods could thus be established without regard to possible out-of-focus conditions during the remaining, unobserved, portions of the cycle. Dial indicator readings were then recorded in relation to the phase settings. A contactor on the projector shutter timed a short-duration light flash for establishing correct phase reference.

The equipment as described permitted studies of film behavior under actual operating conditions.

tion on the screen, and good optical performance can take place only during that part of the exposure in which the film displacement line lies within the depth-of-focus range. The "best average focus" thus obtained gives the best attainable image at the center of the screen.

Actually, in practice, the projectionist may choose a slightly less negative lens position, which is a compromise to gain relatively fair overall definition across the whole screen. Even this compromise results in a fairly large percentage of "out-of-focus" time during a cycle. For the conditions demonstrated in Figure 1, good optical performance is attained during only about 40% of the first exposure and 60% of the second exposure, or a total of only 50% during a complete frame cycle. This is the best the projectionist can do.

The figures so far presented demonstrate the magnitude of the defect with which we are concerned, since they have been obtained with representative equipment, operating under conditions which might be found in any large theatre. For test purposes, the projector was fitted with facilities to determine the various focus positions of the 5-in. focal length $f/1.9$ projection lens.

Experimental Equipment Used

The light source was a Hi-Candescent Arc Lamp, with F-2 condensers, burning at 160 amp and delivering about 9000 lm to the screen with the shutter running.

All focus settings were made with the aid of Simplex Screen Scopes. The 8-power magnification thus provided enabled lens adjustment with greater precision than could have been attained by direct observation of the screen from the projector.

The film plane position along the optical axis was measured directly in terms of lens displacement, a dial indicator calibrated in thousandths of an inch being affixed to the lens mount for this purpose. Initial calibration for zero position on the dial indicator was made by focusing the lens to produce a critically sharp image of a conical hole in a flat steel plate, the small end of the hole being in the same plane as the emulsion contacting surfaces of the film trap.

The addition of a viewing shutter to the equipment enabled observation of

Continuous Air Blast Action

The technique of continuous air-blast cooling of film, by which opposing air forces of the front and rear jets are adjusted so as to produce a force for positioning the film, was found to be at best a partial solution to the problem. It is possible to move the film by this method and to shift the average focus position; the resultant force, however, acts upon the film continuously, and therefore, cannot correct for the intermittent cyclical deformations which occur during the two exposure periods.

The center of each frame travels over a range of about 0.020 or 0.030 in. This range is not greatly reduced by application of a continuous displacing air force

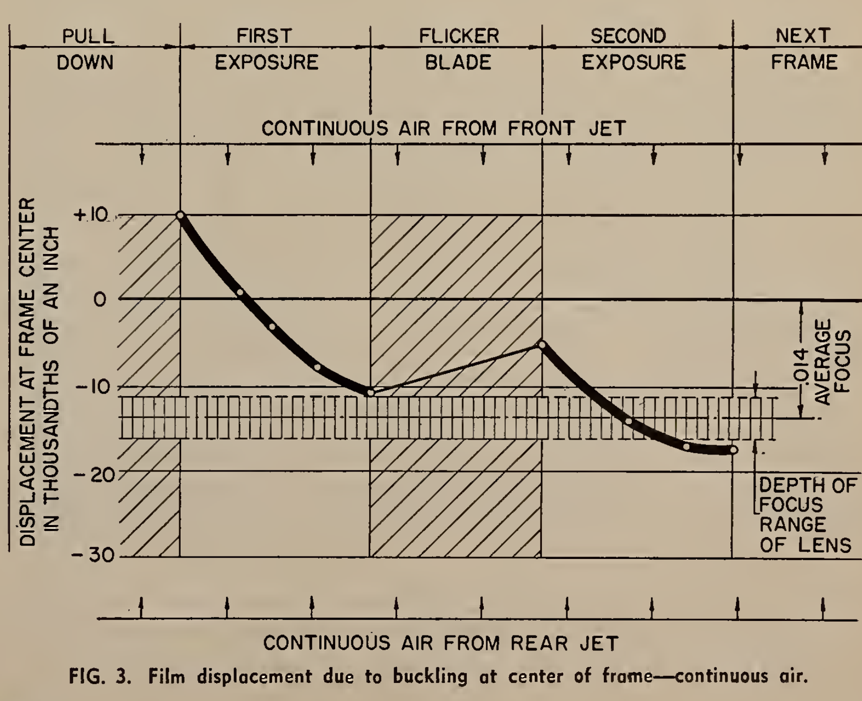


FIG. 3. Film displacement due to buckling at center of frame—continuous air.

(Figure 3). The continuous jets produce a shift in average focus position; this, by itself, only slightly alters the ratio of "in focus" and "out-of-focus" intervals. The air serves primarily as a cooling agent, preventing possible damage to the film in the form of embossing or blistering or the formation of permanent buckle.

It was felt that, because of the cyclical nature of the film frame deformations involved, any corrective action to neutralize the defects should be similarly cyclical. Hence, the following approach (Figure 4) was tried:

(a) The air from the front jet was modulated by means of a rotary valve driven from the shutter shaft.

(b) The air from the rear jet was not modulated and the steady stream of air from this jet was used to force the film toward the lens, thus partly neutralizing the internal forces, which tend to make the film take a deep negative buckle under the influence of light.

(c) The correcting air pulses from the joint jet were timed so that the resultant forces from both front and rear jets opposed the cyclicly varying buckle forces. The motion of each film frame on the optical axis could thus be controlled.

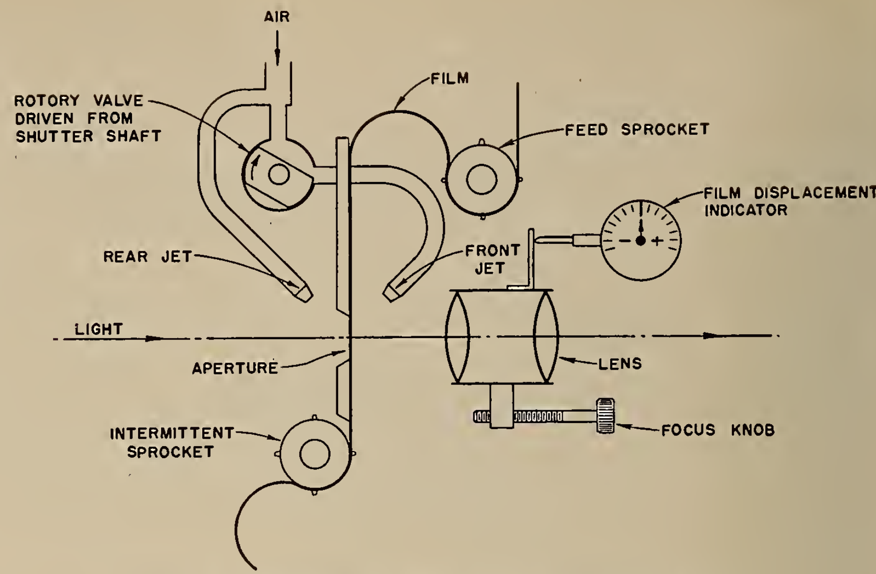


FIG. 4. Arrangement of air jets and film displacement indicator.

Intermittent Air Blast Action

Figure 5 illustrates the timing of the jets and shows that the position of the film frame can be held steady within fairly close limits. It should be noted that the excursions of the film frame surface can be confined to the depth-of-focus range of the lens. Good optical performance is thus attained over virtually the entire frame cycle.

Figure 5 also shows that a negative displacement of approximately 0.012 in. is allowed to exist at the center of the frame. The question may be asked, "Why is the process not carried beyond this point so as to bring the displacement to zero?" There are two reasons for not doing so. The first is concerned with the performance of the projection lens. In most projection lenses the focal plane of field is not truly a plane, but rather a curved surface. For best performance in this respect, the film is allowed to approximate this surface. The second reason is that flat film seems to be somewhat flaccid under the influence of air flow, as compared to film which is bowed to even a slight degree.

Since the film can be kept within the depth-of-focus limit of the projection lens during nearly the entire time of the two exposure periods, there is marked improvement in screen image definition.

Experiments so far have been directed toward the use of the modulated front jet. It is quite possible to use the opposite arrangement of a steady front jet and pulsed rear jet. For better cooling, however, it seems advisable to let the continuous air stream wash the emulsion side of the film, relying on the front jet as the position correcting agent. A pulsed combination of both jets may offer some advantages in air economy, but has not been tried.

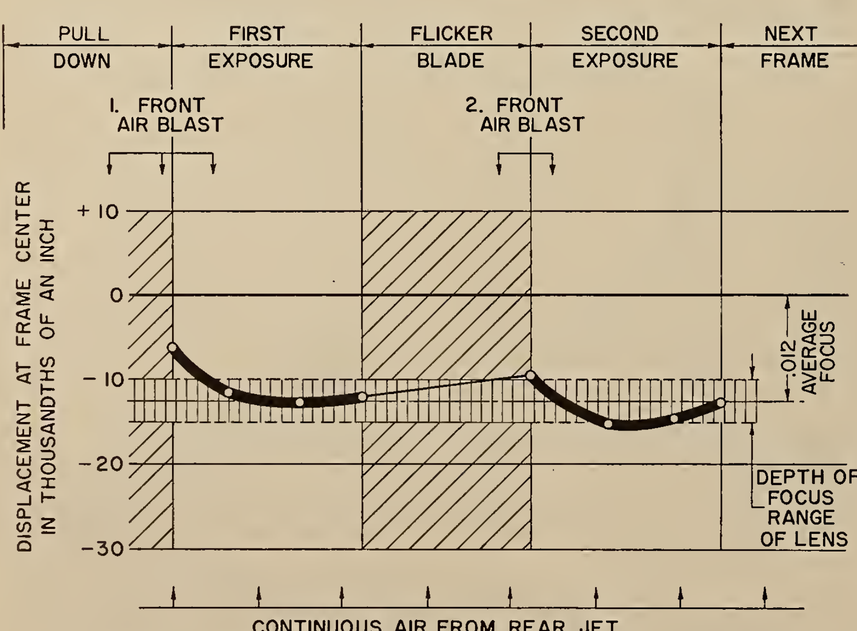


FIG. 5. Film displacement due to buckling at center of frame—pulsed air.

TESMA-TEDA-ALLIED-TOA

In 1953 Theatre Owners of America will join the Theatre Equipment and Supply Manufacturers Association in a joint trade show and simultaneous conventions, Roy Boomer, TESMA secretary announces. Allied Theatre Owners and Theatre Equipment Dealers Association, which are linked with TESMA in the current year's conventions and trade show, will continue to participate, in a quadruple gathering and exhibition in 1953.

This year, however, TOA, which has just had its own get-together and equipment exhibit in Washington, D. C., will not participate in the TESMA-TEDA-ALLIED affair at Chicago next month. The three organizations will stage their festivities at Chicago's Morrison Hotel, November 15-19. Luncheons, cocktail parties, dinners, and banquets are part of the program, providing a festive background to more serious business. Special plans have been made for the entertainment of ladies attending. More than 100 booths will display almost every item of theatre equipment made in the U. S.

Next year's four-ply meeting, it has been decided, will also be held in Chicago, but at the Hilton (formerly Stevens) Hotel, and on the dates October 31 to November 4; two weeks earlier than this year.

16-mm Leads at SMPTE Meet

FOR probably the first time in the 36-year history of the Society of Motion Picture and Television Engineers 16-mm projection received more consideration at a semi-annual convention than 35-mm.

This was at the Society's 72nd semi-annual convention held at Washington, D. C., October 6-10. A wide range of subjects relating to many different phases of motion picture and television technology was canvassed in the course of 94 technical papers and reports. The largest number of papers dealt with ultra-high speed motion pictures used in analyzing motion, mechanical operations and even chemical changes. But 16-mm ran second to this absorbing topic, surpassing in number of papers presented, not only 35-mm but also photography and television. Three of the 16-mm papers, which may be of value to projectionists interested in servicing 16-mm projection equipment, are reviewed in some detail below.

Officers and Awards

The Society elected new officers, to serve for two-year terms, and conferred usual and extraordinary awards, honorable mentions and fellowships upon a number of its members.

Herbert Barnett, assistant to the president of General Precision Laboratory, was chosen president of the SMPTE, succeeding Peter Mole.

Dr. John G. Frayne, Westrex Corporation, is now executive vice president; Dr. Norwood L. Simmons, Eastman Kodak Company, editorial vice president; John W. Servies, National Theatre Supply, convention vice president; Edward S. Seeley, Altec Service Corporation, secretary.

Governors now are—for Eastern states: Gordon A. Chambers, Eastman Kodak Company; and Charles L. Townsend, National Broadcasting Company. Central states: Frank E. Carlson, General Electric Company, and Malcolm G. Townsley, Bell and Howell Company. Western states: William A. Mueller, Warner Brothers; and LeRoy M. Dearing, Technicolor Motion Picture Corporation.

Henry J. Hood, Eastman Kodak Company, has accepted the office of engineering vice president in place of F. T. Bowditch, National Carbon Company, recently resigned.

Society awards were conferred upon Dr. Herbert T. Kalmus, of Technicolor, Inc., John I. Crabtree of Eastman Kodak Company, and Axel G. Jensen of Bell Telephone Laboratories, Inc., who were allotted the Samuel L. Warner Memorial Award, the Progress Medal, and the David Sarnoff Gold Medal Award, respectively.

William C. Kunzmann, retiring as convention vice president after 36 years of service to the Society, was honored with a gold life membership card and a testimonial luncheon.

Fellowships were conferred upon John Arnold, M-G-M; E. E. Blake, Chairman of the Council of Kinematograph Manufacturers Association of Great Britain; O. L. Dupy, M-G-M; Karl Freund, Warner Brothers; Edgar Gretener of Zurich, Switzerland; W. T. Hanson, Jr., Eastman Kodak Company; C. E. Heppberger, National Carbon Company; Henry Hood, Eastman Kodak Company; A. G. Jensen, Bell Telephone Laboratories; Klaus Landsberg, of Hollywood; E. H. Reichard, Consolidated Film Industries; A. C. Robertson, Eastman Kodak Company; Ben Schlanger, theatre architect, New York; John G. Stott, Du-Art Film Laboratories, and E. W. Templin, Westrex Corporation.

Approximately 200 ladies attending the convention were received at a White House tea by Mrs. Truman on October 8th.

It was disclosed that the Society now numbers nearly 4,000 members, in 50 different countries. Members and guests registered at the Convention in unprecedented number, almost 900, in fact.

Papers and Reports

Of the 94 papers and reports presented those of especial interest to projectionists will be condensed in these pages during the months to come.

Three papers, however, will be summarized in some detail in this place. Two of these review the servicing and maintenance policies of 16-mm equipment manufacturers, Ampro Corporation and Bell & Howell Company. The third describes the SMPTE 16-mm test films.

Henry H. Wilson, Ampro Corporation service manager, pointed out that his company's arrangements for maintaining 16-mm equipment include both factory

(Continued on page 26)

New president Herbert Bornett (right) greeted by his predecessor, Peter Mole.

"Bill" Kunzmonn (left) receiving leother-bound testimoniol from Nothon D. Golden ot luncheon tendered to Kunzmann in recognition of his 36 years service os vice president of the Society.

Peter Mole (left), retiring president, presents Dovid Sornoff Gold Medol to Axel Jensen of Bell Lobs; Somuel L. Worner Memoriol oword to Wodsworth Pohl on beholf of Dr. Herbert Kolmus of Technicolor, obsent through illness; Progress Medol to John I. Crobtree of Eostmon Kodok, ond Journol Aword to D. L. MocAdom, olso of Eostmon. Recipients ore pictured from left to right in order here nomed.

IN THE SPOTLIGHT

WE STILL receive from time to time complaints from projectionists in various parts of the country about the poor condition of prints as delivered by the film exchanges. Although their complaints vary as to the nature of the film damage, the most consistent "beef" is "careless handling and incomplete inspection in the exchanges." The projectionist, of course, finds himself put on the spot, so to speak, when a break in the film occurs and the show is interrupted. One of our readers suggests that if the exchanges would merely inspect and repair the prints and deliver them *unrewound* to the theatres, the projectionists, in the process of rewinding the film, could double-check on breaks, patches, *etc.* This would not only minimize the possibility of a break in the show, but would also prolong the life of the film.

Film mutilation has long been a bone of contention—with projectionists and exchanges passing the buck to one another. IP has published many articles during the past years on the proper handling of prints* and we believe that they are of sufficient importance today to warrant running them again in a future issue. Any comments?

• In line with IA policy, new units are constantly being added to its newly formed Radio and Television department. The latest one to come to our attention is now being organized in Omaha, Nebr.

• William Green was unanimously re-elected president of the American Federation of Labor at the 71st annual convention, held recently in New York City.

• John DeLorenzo, member of Milwaukee Local 164, was a delegate to the National Coast Guard convention held in Toledo, Ohio.

• "Pension Plans Under Collective Bargaining" is the title of a new 105-page booklet recently released by the AFL. This pamphlet covers many problems confronting unions in setting up pension plans, and describes the pros and cons of various alternative approaches. Such questions as "Pension Cost Factors," "Benefit Provisions," and "Methods of Financing," are among the many discussed. The pamphlets are 25c each and may be obtained from the American Federation of Labor, Washington, D. C.

• The attempt of Bennie Berger, well known Mid-West theatre exhibitor, to break down the projection room manpower prevailing in Minneapolis, Minn., has not shaken the determination of Local 219 officials to maintain existing conditions. Theatreman Berger recently purchased the building which houses the Aster Theatre and offered to take over the balance of the four-year lease of the theatre, now held by the Minnesota Amusement Co., provided Local 219 would agree to a reduction in projection room personnel. Needless to say, the Aster Theatre remains dark.

• Local 400, Alexandria, La., will celebrate its 40th anniversary in 1953. Plans are now under way to make this celebration an outstanding one. Stewart Wilson, secretary, and Prentis E. Flowers, both charter members of the Local, have been appointed to the arrangements committee.

• A gold life membership card in Local 222, Shreveport, La., was awarded last month to George E. Findley. Findley is a charter member of the Local, having been one of its original organizers back in 1911.

• A precedent was established by the city licensing bureau of Boston, Mass. when it banned the showing of 16-mm films in the Alpini restaurant. The bureau ruled that the restaurant's food, liquor, and entertainment license does not cover the showing of motion pictures and the management's plan to show 16-mm features to its customers has been abandoned.

• John Callahan, president and charter member of Local 195, Manchester, N. H., was a delegate to the State Federation of Labor convention recently held in Keene, N. H. His son, Bradley, business representative for Local 685, Concord, N. H., is a vice president of the State Federation.

• E. Clyde Adler, president of the Michigan Alliance, IATSE, announced that the Alliance had authorized, at a recent special meeting, an assessment on all its members of from 10 to 25 cents per week in an effort to raise a fund of at least $25,000, to be used to help defray legal expenses incurred by various IA Local Unions in disputes with exhibitors. Adler, who is also the business representative for Detroit Local 38, contends that many of the controversies stem from the efforts of the exhibitors to cut down projection room costs.

• Members of Local 723, Norwood, Mass., marked the first meeting of the season by holding a breakfast party at the Norwood Sports Arena.

• Pittsburgh Local 171 lost one of its oldest members in the death last month of Samuel Berkowitz, 70, projectionist for many years at Warner Bros.' Nabe Theatre. He is survived by his wife, five sons, and three daughters.

• Lloyd V. Stoddard, member of Local 180, Everett, Wash., has been elected Washington State Commander of the American Legion. He is now on a leave of absence from the industry to devote full time to Legion duties.

• Local 547, Florence, Sheffield, and Tuscumbia, Ala., entered a float in the Labor Day parade at Sheffield.

• Roy M. Wier, Local 13, Minneapolis, Minn., has been renominated to the U. S. House of Representatives. He scored a 3-to-1 victory in the Democratic-Farm Labor primary in Minnesota's Third District.

• H. Paul Shay, secretary of the Tenth District and a member of Local 289, Elmira, N. Y., has been elected chairman of Chemung County Draft Board No. 64.

• Eighth International Vice-President Hugh J. Sedgwick has been commended in a resolution passed by the Hamilton (Ontario) Planning Board following his

* Projection Room Handling of Prints, by Robert A. Mitchell, March, 1948, p. 5; Causes and Prevention of Damage to 35-mm Theatre Release Prints, October, 1948, p. 5, etc.

recent resignation from that group. Said the resolution: "He is an indefatigable worker, whose accomplishments could only have been attained by sacrifice and denial of leisure time demanded by most people." Sedgwick is also secretary and business representative for Local 303, Hamilton, Ont., Canada.

• *Out-of-Town Visitors to IP Offices:* Robert Conway, Local 297, San Diego, Calif.; M. Ingraham, Local 253, Rochester, N. Y.; Stewart A. Seifert, Local 203, Easton, Penna.

• Leland H. Swain, 65, president of Local 123, East Liverpool, Ohio, died several weeks ago at his home in Calcutta, Ohio.

• Magnus Nielsen, Local 150, Los Angeles, Calif., represented his Local at the Calif. State Theatrical Federation and Calif. State Federation of Labor Conventions, held at Santa Barbara, August 23-29.

• Speaking of pensions, Bert Barber, member of Local 371, Edmonton, Alta., was retired last month by Famous Players Canadian Corporation on a monthly pension of $75. We were advised by Fred Broadbent, secretary of the Local, that the company will not only pay the full cost of the pension but will also continue payments on Barber's life insurance and hospitalization premiums.

25 Years Ago October 1927

• The General Executive Board sat in session at the Alexandria Hotel in Los Angeles. . . . Local 353, Port Jervis, N. Y., and Local 411, Lindsay, Ont., Canada, suspended for non-payment of per capita tax, in compliance with the International Laws. . . . Ashland, Ohio, Local 576 issued a warning against an imposter using the names of Franks and Blake, who has been borrowing money from various IA members on the strength of his fraudulent claims of affiliation with the Local.

• The following letter received from one of our readers is self-explantory. We believe it deserves consideration and we pass it along for what it is worth:

To the Spotlight Editor:

I would appreciate a little space in your "Spotlight" department for the publication of this letter in which I have set down some ideas about a matter that has been in my mind for quite some time.

As you know, there are many men in the Alliance who, like myself, pioneered in our field and the day when we old-timers will want to retire from our profession is not too far distant. Many, in fact, have already retired; and the list

PIONEERS IN THE INDUSTRY

A group picture of old Powers men taken in the early 1920's, in the days before sound pictures became a reality. Back row, left to right: Frank Cannock, Joe Robin, Jay C. Kroesen. Front row: Lester Betts and Cecil R. Wood, Sr.

is growing steadily. What bothers me particularly is the fact that when a man wishes to retire from the profession, he goes through the usual motions—makes application at his Local for retirement and after the usual procedure he is informed that his name has been placed on the retired list. So far so good—Mr. Oldtimer is now a man without a profession and outside of whatever pension benefits he may be entitled to from his Local, he is to all intents and purposes a forgotten man—that is, as far as his former union affiliation is concerned.

The thought occurred to me that if each man retiring from an IA Local were presented with an IA retirement card issued by the General Office, signed by the International president and bearing the IA official seal, the retired member will have something tangible to show for his many years membership in the Alliance. The card need only state that the bearer held membership in a given Local for a certain number of years, was a member in good standing, and that he retired on a certain date of his own free will.

Also, it occurred to me that the hospitalization benefits so many IA Locals now enjoy might be extended to take care of retired members. It seems to me that these benefits are most needed when a man retires from his life's work and his chief source of income stops.

I would very much like to get the reaction of my fellow members in the Alliance to the aforementioned.

Sincerely,
MORRIS J. ROTKER
Member, New York Local 306
Past president, 25-30 Club

• Bradley Marcotte, 57, vice-president and business representative of Local 425, Kankakee, Ill., for the past 17 years, died October 7. Marcotte joined the Kankakee local back in 1920, transferring to Houston Local 279 in 1926, remaining there until 1933 when he returned to Local 425.

• Harold Cohen, 51, member of New York Local 306 and projectionist for the past 28 years at Warner Bros. studio, died early this month.

New Pictorial Series

Pictorial Films, Inc., 1501 Broadway, New York, will distribute in the U. S. and throughout the world except the United Kingdom, a series of 18 new color cartoons to be made by Toy Town Producers in England; and will distribute throughout the Western hemisphere five additional color cartoons made by British Animated Films. All these prints will be available on 35-mm, 16-mm, and 8-mm stock.

AFL Backs IA on Tax, 16-mm Suit, Film Imports

THE WHOLE strength of the American Federation of Labor has been put behind the IATSE in the latter's opposition to the 20 percent theatre admission tax, the 16-mm anti-trust suit, and the practice of making films abroad for American showings. At their convention in New York City toward the end of September the AFL adopted unanimously resolutions endorsing the IA stand in all of these matters.

The resolution calling for repeal of the 20 percent Federal admission tax was not only unanimously adopted, but also referred to the AFL committee on taxes for action.

The resolution opposing the 16-mm anti-trust suit pointed out that if this action which demands that producers make their films available to telecasters as well as to theatres, were to succeed, not only would many theatres be forced to close, but the surviving theatres would no longer get pictures of existing quality, because the diminished revenue reaching producers could not finance such creations. Thus the livelihoods of a quarter of a million AFL workers in the film industry would be endangered. The resolution directed the AFL executive council to investigate the sources and motivation of this lawsuit, and instructed all AFL publications to give wide publicity to Labor's opposition to it.

The resolution on foreign production of either theatrical or advertising films opposed this practice when undertaken "for the purpose of . . . capitalizing on cheap foreign labor," or of avoiding American taxes or other normal American production costs.

16-mm

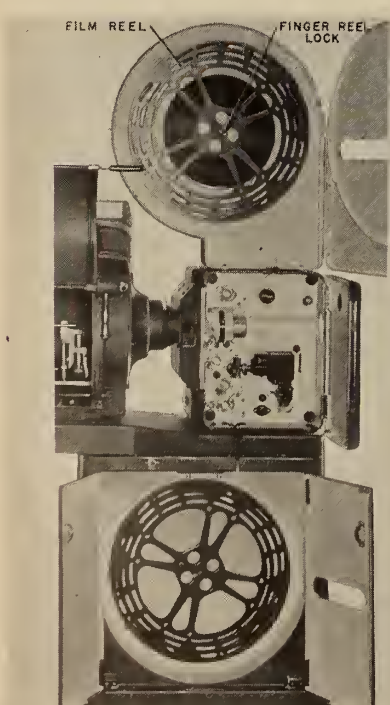
BECAUSE EXPANSION OF 16-mm ACTIVITY PROVIDES INCREASING FIELDS OF EMPLOYMENT FOR SKILLED PROFESSIONAL PROJECTIONISTS IN TV STUDIO AND NON-THEATRICAL SHOWINGS, AS WELL AS ENHANCED POSSIBILITIES OF PERSONAL BUSINESS VENTURES, THIS 16-mm DEPARTMENT OF IP WILL APPEAR MONTHLY.

General Precision Laboratory's 46-Ampere Arc Projector

Model PB 102 has intermittent sprocket instead of shuttle-activated claw, utilizes pulsed air blasts to steady film in gate and improve accuracy of focus, and can be supplied with either of two sound systems as preferred.

GENERAL PRECISION LABORATORY'S Model PB 102 16-mm projector, pictured here, is an arc-illuminated mechanism with intermittent sprocket instead of the more usual intermittent claw, designed throughout for top quality performance and priced accordingly. Picture steadiness, both vertically and horizontally, is rated better than 0.2 percent of the corresponding frame dimension. Test films, it is stated, have run through the mechanism 1,000 times, and test loops 4,000 times, without visible damage to sprocket holes.

The gate is finished to a mirror surface, all sprockets and pad rollers are undercut to eliminate contact with picture or sound areas of film, except only at the sound drum where slippage does not normally occur. Projection lenses are rated f/1.6 and illumination at every point of the screen is said to be not less than 85% of that at the screen center. Sound scanning slit is 0.0005 inch, yielding reproduction rated equal to or better than 8 db down at 7,500 cycles without compensation of any kind. Illumination across the width of the soundtrack is rated even, within not more than 1½ db variation. Projection reels have a capacity of 4,000 feet, or 110 minutes performance.



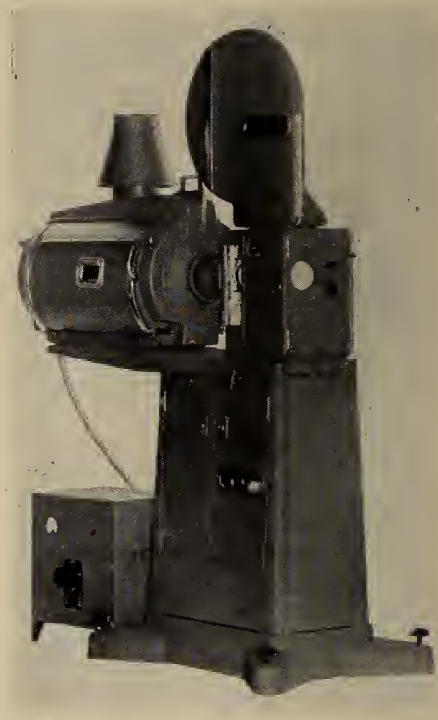
Portion of PB-102 projection assembly shown with doors open disclosing upper and lower reels. The condenser-heat filter is located in the conical lamphouse extrustion between dowser and projector.

Two different sound systems are available with this projector, and the model number modified accordingly. As supplied with audio amplifier A20W the equipment is coded Model PB-102; if it is supplied with pre-amplifier AP-6MW it is coded Model PB-102A. The latter arrangement is intended for installation in a theatre or elsewhere where suitable power amplifiers exist and pre-amplification only is needed. Loudspeakers are not part of either model.

Both models incorporate the Strong Electric Corporation 46-ampere arc lamp, Model 19600, and the corresponding Strong rectifier, Model 16196. Power is drawn from a 220-v., 1-3 phase line. Both models also are supplied complete with a tilt-top enclosed pedestal, necessary connecting cables, and air hose.

Special Features

Among outstanding special features is one so new its basic principles are described in IP for the first time in this present issue (see page 14) and were reported in the *Journal* of the SMPTE for the first time only in August of this year. This is the use of pulsed air blasts for reducing film buckle. For details, see page 14; in general, the contrivance is one designed to counteract the tendency of all film to buckle temporarily while in the gate. Cause of this buckle is the fact that emulsion absorbs more heat than does the film base; a differential expansion thus takes place with the emulsion convex; and the film therefore cannot be kept in perfect focus by any adjustment of the lens.



PB-102 projection assembly showing arc lamp and lamp rectifier (left of pedestal). Lower magazine is inside pedestal. Amplifier is a separate unit, not included in this assembly.

Pulsed air blasts timed to the shutter action reduce this tendency toward buckling sufficiently to keep the film at all times within the depth of field of the lens, making possible improved accuracy of focus on the screen, and by cooling both film and gate protect the film against permanent deformation.

In the PB 102 the synchronized air valve referred to on page 14 of this issue is not used; instead, the shutter of the projector acts as the pulsing valve, admitting or cutting off, according to its position, the stream of air provided by the compressor which is part of the total installation.

The compressor is not part of the projector assembly nor driven by the

projector motor. It is equipped with its own motor. The projector pedestal is equipped with an air pipe. At the time of installation the compressor and its motor are located at any convenient distance from the projector, placement being limited only by the length of air hose and power cable provided. The hose links the compressor to the pedestal air pipe, through which in turn air is conducted to its vent at the projector shutter location.

Air is supplied at a pressure of 30 pounds per square inch and at the rate of 2¾ cubic feet of air per minute.

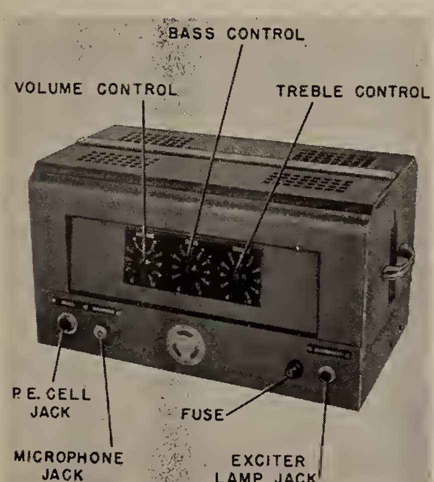
Another special feature is the lamphouse "condenser" so called—although the lamp is a mirror type. The condenser is, as a matter of fact, plano-convex, but its really striking feature is the multi-layer coating on its flat side. These layers in the aggregate constitute an infra-red filter; or more accurately, a visible-spectrum by-pass filter. The glass used is heat-resisting; is not cooled by the pulsed air blast, and does not need cooling.

Optically, the plano-convex filter, being part of the optical system, improves the efficiency from the f/2.3 of the lamp to f/1.6—thus matching a lamp otherwise suited to 35-mm projection with the f/1.6 lenses used in Model PB 102.

Sound Equipment

Presented here pictorially is one of the two sound amplifiers available with this equipment, the Model A-20-W, which has an output of 20 watts. Incorporated in it, as part of its circuitry, is an rf (30 kc) oscillator that provides an inaudible frequency for the filament of the exciter lamp.

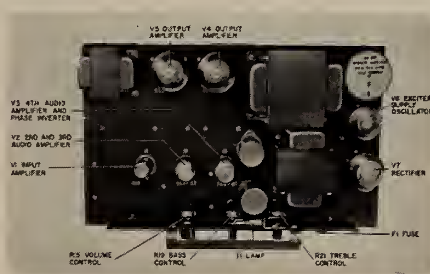
In performance, this amplifier is rated at response flat within plus or minus 1 db from 50 to 10,000 cps (with tone controls set in mid positions). Output is rated 20 watts at 1,000 cps with harmonic distortion of less than 0.7 percent at 15 watts, and intermodulation distortion less than 3.0 percent at 15 watts. Signal to noise ratio with volume controls at optimum positions is given as 69 db. Output (speaker circuit) impedance, 8 to 16 ohms.



Exterior view of A-20-W model amplifier, with separate bass and treble volume controls and overall volume control; provision for microphone as well as PEC input, and exciter rf supply (30,000 cps). Rated output, 20 watts, meets requirements for an audience of 1,000.

Loudspeakers are not part of the system when the same is bought as a unit.

When the PB-102 equipment is to be used in a theatre already fitted with power amplifiers and speakers, the Model A-20-W 20-watt amplifier is not needed, but a pre-amplifier is still desirable. The PEC output would in many cases deteriorate in quality, and pick up noise and interference if transmitted to the installed amplifiers without intermediate pre-amplification. In addition to a pre-amplifier, a source of rf for the exciter lamp is required to take the place of the oscillator tube that supplies this rf when the A-20-W is used; and the 16-mm soundtrack output must be equalized for the characteristics of a 35-mm amplifier system.

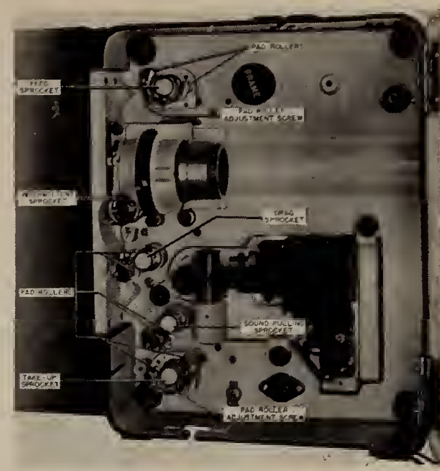


View of A-20-W amplifier with top cover removed. Output tubes are 6L6-GT's. Circular case at extreme top right houses rf transformer for exciter supply; just left of it is power transformer; below power transformer filter choke; filter condensers left of filter choke; output transformer at upper left.

For such applications pre-amplifier AP-6MW is provided; plus choice of either of two rf exciter supplies, RF-30K or RF-30K-LI. When these items are used instead of the A-20-W power amplifier the nomenclature of the system is modified and it is designated Model PB-102A, instead of PB-102.

AP-6MW pre-amplifier is rated at an output level of 6 milliwatts into a 500 ohms line. Other output impedances may be used, however, the transformer secondary being tapped for 50, 125/150, 200/250, 333 and 500/600 ohms. Noise level is rated 60 db below 6 milliwatts. Volume control, and also separate bass and treble volume controls, are provided.

Exciter supplies RF-30K and RF-30K-LI are identical except in that the latter provides an additional 6.3 volt, 60-cycle output for the threading lamp in the projector, while the former does not. Both use a 5V4G rectifier tube powering a 6L6 oscillator which in turn generates the 30kc output.



Operating side of the PB-102 combination projector-soundhead showing film path, projection lens and optical sound reproducer.

Arc Lamp and Rectifier

The projection light is supplied by a Strong Electric Corporation mirror lamp, Strong No. 19600, utilizing a 7-mm positive and 6-mm negative, operating at 33 volts, 43 to 48 amperes, DC. As a safety measure, AC supply to the rectifier is interlocked at the lamphouse door, and open-circuited when the lamphouse is opened.

The rectifier (also by Strong) is a 220-volt input, tube type unit. Its panel mounts an 8-point rotary switch through which carbon current may be readjusted as the lamp warms up in operation; and a voltmeter which may be consulted in association with the ammeter on the lamp. A jumper arrangement on the terminal strip inside the rectifier has been provided to permit compensation for line voltage variation.

BIS Announces Three New Films

British Information Service announces three new films now available in 16-mm sound versions.

Renting at $2.50 a day and selling at $57.50, "The Twenty-Ninth Blitz" is the detailed story of the heaviest air raid on London in World War II, when over 100,000 missiles were dropped, and 1,100 fires started, in the space of four hours. The film is in two reels, black-and-white, with a running time of 18 minutes.

"Antarctic Whalehunt" follows a whaling expedition throughout an entire season, stressing at the same time the need for limitations on whaling to avoid further depletion of whale stocks, and the need for more humane methods. Rental price is $2.50 per day, sale price $55.00. The film is in two reels, black-and-white, with a running time of 19 minutes.

Running 11 minutes in black-and-white and renting at $1.50 per day (sale price $32.00) is "Love of Books," showing the mechanics of making and binding books in a spirit of fine craftsmanship. Stills from this reel are available.

The American Labor Movement

Chapter III.

Between Two World Wars

DURING the year following World War I, a combination of events occurred which led to an increase in the number and severity of industrial disputes. Following a brief downswing in business immediately after the war, there was a quick revival, accompanied by rising prices. By mid-1919, labor was faced with the mounting cost of living. Real wages lagged. At the same time, withdrawal of the Government's limited protection of labor's right to organize and the termination of wartime governmental labor agencies removed restraints which had kept industrial relations running more or less smoothly during the war years. As a result, numerous employers refused to recognize labor unions which had been organized in their plants. So, to protect their recently won gains, many labor leaders called for more aggressive action.

In September 1919, a strike was called in the steel industry by the AF of L Iron and Steel Organizing Committee, which was composed of the presidents of the 24 international unions that had jurisdiction in the industry. The strike was called off in January 1920, after most of the strikers had drifted back to work, with the unions failing in their attempts to gain recognition in the industry.

A strike by the United Mine Workers in the coal-mining industry began on October 31, 1919, but was called off on November 10 after the court granted the Government a permanent injunction against it. In some localities the strike continued into December 1919, when the union agreed to the Fuel Administrator's proposal for an immediate 14-percent wage increase and to President Wilson's offer to appoint a tripartite coal commission to pass on further demands.

Depressions Harm Labor

The economic recession in 1921 and 1922 resulted in many serious work stoppages, such as the railroad shopmen's strike in the summer of 1922. These protests, however, failed to check a general wage reduction movement which also marked the beginning of a decline in union strength. Many unions continued to lose ground despite the rise in business activity, which occurred in the late 1920's. Professors Millis and Montgomery in their book *Organized Labor* advise that the 1920's were years which should "according to historical precedents, have witnessed labor militancy, aggressiveness in conquering unorganized areas and in entrenching more strongly job control already obtained." Instead, this period "found old and established unions experiencing difficulty in maintaining past gains and something akin to inertia, pacifism or disillusionment pervading the movement as a whole."

The successes of antiunion employers in many industries (metal, automobile, railroad, etc.) gave this period its popular title—the "open shop era." To weaken or disrupt labor organizations employers in these years introduced a variety of welfare measures, ranging from athletic fields to pension plans, as well as such repressive measures as the use of spies and strikebreakers. Company unions dominated by employers were likewise established. "Yellow dog" contracts, requiring a worker to promise, as a condition of employment, that he would not join a labor union, were also used effectively.

The varied effects of this period on the union movement are described by Lewis Lorwin:

> A considerable part of the membership was able to obtain higher wage rates, increased earnings, and shorter hours. The 40-hour week in unionized plants was widely accepted, while about half a million union members obtained the five-day week. This was notable in the building trades, in some branches of the transportation industry, in the printing trades, in Government employment, and in some of the professions, such as teaching and acting. But where unions were unable to meet the new conditions they suffered a decline in membership, a loss of income, and a weakening of their benefit systems; and they could enforce their standards over smaller areas.

From 1920 to 1923 total union membership fell from about 5 million to slightly over 3½ million. It still remained at this lower level (approximately 3,625,000) in 1929, at the height of the country's "prosperity." Of the 105 AF of L international and national unions active in 1929, only 44 had held their own or expanded their membership after 1925. Most of these were in the building and printing trades, transportation, Government service, and amusements.

The economic depression and widespread unemployment which followed the 1929 stock market crash further reduced union membership to 3¼ million by 1932. This decline was particularly pronounced in industries where machinery was displacing skilled hand labor and in the "sick" industries of mining and textiles, as well as in other industries which had been artificially stimulated by the war. Many unions were hard pressed to survive and maintain some semblance of effectiveness.

Labor Gets New Deal

It was not until after the enactment, in the spring of 1933, of the National Industrial Recovery Act, including section 7 (a) which guaranteed the right of employees to organize into unions of their own choosing and to bargain collectively with employers, that tradeunionism in the United States began to revive. This revival brought a tremendous influx of new members from the mass-production industries into the ranks of unions. Another contributing factor was the enactment, in 1932, of the Norris-La Guardia Act, which limited the use of court injunctions in labor disputes.

Workers in the automobile, rubber, cement, and aluminum industries were rapidly organized on an industrial basis. These new unions were chartered directly by the AF of L as Federal labor unions, since no corresponding international unions existed to absorb them.

Many of the national and international unions which were affiliated with the AF of L also registered substantial gains in membership between 1933 and 1935. The International Ladies' Garment Workers' Union increased its membership from 40,000 to over 150,000. The roster of the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America rose from 94,000 to 130,000. Membership in the International Association of Machinists expanded from 75,000 to 90,000. Other unions reported smaller but nonetheless significant increases.

Further growth was slowed down temporarily by court invalidation of the National Industrial Recovery Act in May 1935 and by the rapid growth of employee representation plans established primarily for the purpose of checking the spread of unionism.

[TO BE CONTINUED]

Theatre Tv Hearings On

Hearings on allocation of television channels for exclusive use of theatre programs, and on rules and regulations to govern theatre Tv service, will be opened by the Federal Communications Commission at Washington on October 20th. The hearings were requested by producer and exhibitor groups, the Motion Picture Association of America, and the National Exhibitor Theatre Television Committee. Engineering and accounting phases of theatre Tv will be canvassed at these hearings. A second group of hearings has been announced by FCC to begin January 12th, when testimony will be received on comparative costs, advantages and disadvantages of telephone as against radio transmission.

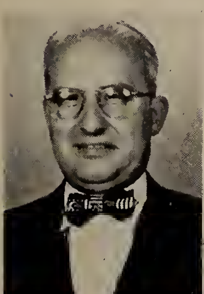
PERSONAL NOTES

EARLE G. HINES has resigned as chairman of the board of General Precision Equipment Corporation but continues his association with GPEC under a consulting arrangement. HERMANN G. PLACE, GPEC's president and chief executive, was elected to serve as board chairman in addition to his other duties.

Also elected to the board were WLADIMIR A. REICHEL, who furthermore has been

Earle G. Hines

Hermann G. Place



F. D. Herbert, Jr.

Wladimir A. Reichel

named vice president of GPEC, and FREDERICK D. HERBERT, JR. They are the principal executives of Kearfott Company, Inc., GPEC's most recently acquired subsidiary. GPEC is parent corporation of International Projector Corp. (Simplex), makers of theatre projectors and sound systems, of General Precision Laboratory, Inc., manufacturers of large-screen theatre Tv equipment, and of other very well known corporations in the field of motion picture projection apparatus.

HARRISON ECHOLS, formerly general manager of the Ansco Division of General Aniline and Film Corporation, and more recently with the Consumer Durable Goods Division of National Production Authority, has been named assistant to NATHAN D. GOLDEN, director of the Motion Picture and Photographic Products Division of NPA. Echols replaces JAMES FRANK, JR., who resigned to return to private industry.

DR. DAVID L. MACADAM, Eastman Kodak research scientist, has been selected as winner of the 1952 Journal award of the SMPTE for his paper: "Quality of Color Reproduction" which appeared in the Journal in May, 1951. Dr. MacAdam is one of the world's authorities on color photography.

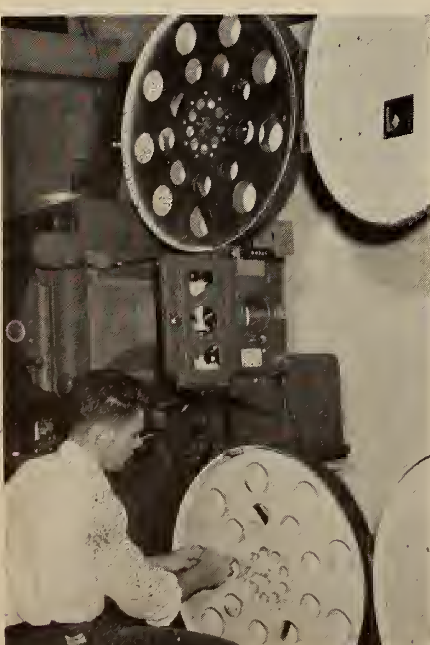
CINERAMA—A STEP IN THE RIGHT DIRECTION

(*Continued from page* 11)

the stereo sound created by the other six fails through equipment trouble in the theatre. In that case it provides merely conventional sound coverage to keep the show alive.

In the illustration, three lines run vertically upward from the camera to each of the three 35-mm films the camera produces; and one vertical line runs upward from the recording console to the 35-mm film carrying the seven soundtracks. The drawing is obsolete, however, in one respect, because these tracks were sketched to suggest optical recordings. Cinerama today uses magnetic instead of optical tracks.

From the soundtrack film a line is shown running upward to a theatre control console; and from this in turn another line runs to a row of loudspeakers. Here again the artist's sketch is suggestive only, not accurate in minor details. Thus, there is a loudspeaker drawn as if atop the central projection booth and apparently unwired; other arrangements also are not literally as shown here. Actually, there are three sets of speakers back-screen—at left, at right, and center. Each of these is excited (*via* amplifiers, of course) by one of the seven soundtracks. There is one cabinet-mounted speaker on each side wall of the theatre and one on the rear wall. Each of these in turn is excited by its own soundtrack only. This accounts for six tracks; the seventh, as said, is in reserve.



This projector hos oversize reels for neorly one hour's continuous entertoinment. There is only one projector in eoch booth; intermission tokes the ploce of o chongeover. Film runs 90 feet per minute; 16 fromes (each frome 6 sprocket holes high) per second.

The picture films shown in the sketch also are not presented nor intended as literally accurate. An exact reproduction of Cinerama film can be found in IP for November, 1950, page 10. The frames are 6 sprocket holes high, rather than four high as usual, and in consequence are substantially rectangular in aspect. Three such frames, projected side by side, produce a merged screen image three times as wide as it is high. The screen is 26 feet high; its width around the curvature would therefore be 78 feet; the chord stretching across the curve from tip to tip is stated to be 51 feet.

The theatre is equipped with three projection rooms. These are the booth-like structures shown in the sketch. In the Broadway theatre three actual booths were built on the orchestra floor, toward the rear of the house, seats being sacrificed accordingly. The three picture films created by the camera are allocated, one to each projection room, threaded into three projectors, and run in synchronism with each other. There is only one projector in each projection room; the magazines are oversize, providing approximately one hour's continuous entertainment. This is followed by a 15-minute intermission; making a total show time of roughly two hours and fifteen minutes.

It will be noted in the sketch that the three projection booths are so oriented that the one at the right projects to the left side of the screen and vice versa; the one in the center projects straight ahead. This arrangement naturally minimizes *projection* keystone that would otherwise result from curvature of the screen but does not affect the *viewing* keystone that afflicts patrons seated at either side of the center line.

In the sketch, the engineer's control "pit" is shown at the front of the orchestra. From it, films are framed and kept in frame and otherwise matched and properly merged, by remote control. At right, just above the right projection booth, is the manned theatre sound control console already noted.

The Projectors

One of the projectors is shown in the accompanying illustration. The exceptional size of the reels and magazines is sufficiently evident. Among details that cannot be shown photographically is the fact that the film operates at normal speed of 90 feet per minute, but, since the frames are each 6 instead of 4 sprocket holes high, it is obvious that the projection rate cannot be the normal 24 frames per second. Instead, they project 16 frames per second. Despite this reduced rate no flicker was conspicuously evident in the performance. (However,

(*Continued on page* 28)

Kilowatt Modulator Among IA-IP Ham Contest Prizes

By AMOS KANAGA, W6BAA
Secretary, Local 409, San Mateo, Calif.

Its big news this month so let's get to it.

The big IA-IP 1952 contest of the IA radio men to see who works the most brothers over the air is really under way with a bang and to top it all the prizes we told you about are starting to roll in. Now we figured that two or three prizes would be it, but (our heartfelt thanks to our friendly jobbers and manufacturers!) we are going to have some pips—and believe me they will be worth shooting for as all of them are first rate and highly sought after gear.

Not all confirmations are in at this early date but to give you a little preview our good friend Leo, WφGHQ, at World Radio Labs. in Council Bluffs, Iowa, has offered the new BandW Model 600 GRID DIPPER. In fact, Leo even hinted that he would probably go along with some nice fat merchandise orders to boot so that you hard-to-please carbon wasters could make your own choice.

Marshal Sanguinet, W5SK, of Marmax Electronics, who I am told is an old time movie man himself, and Max Rothman, W5PJI, who manufactures the famous

Amos Konogo (W6BAA) Sec., Locol 409, Son Moteo, Colif.

Rothman modulater outfits, came through with not the little Marmax modulater but the KILOWATT MODEL! (This has arrived already and I'm tempted to open the big box and QRM you guys.)

Pretty nice don't you think? And its just the start. There's a lot more coming and by next month we probably will have the full list of prizes and their donors for your mouth waterin'. So, brothers, you had better get busy and start racking up those QSO's for 1952 and be sure that good old IP's subscription is in order as we don't want to miss out on any of those desirable prizes. Pass the word along too, will you?

Brother, it's vacation time, there's no

doubt about it judging from the mobiles on the air; and some of those mobiles are space-seeking projection men. A few of the boys found their way up to the top of BAA hill and paid us a visit, drank us all out of coffee (yeah)—and, Oh, man, what rigs some of them had. W6PFF Frank Champlin of 150 down LA way has more generater under his blood than motor. Incidentally that was the first time I had ever met Frank personally and we had yakatad for yars and yars. W6LJA RCA sound man Rudy de Castilla, also of 150, was another swell visitor but had been off the air for a spell. I think all Rudy wanted was a pep talk to get on the air again. A couple of VE boys from Local 348 land were by but I was not home and the XYL didn't get the calls—tell me over the air fellows.

No Gold Awards!!

No Gold Awards this month . . . what happened, gang? But W6LYD Don Johnson of 401 and WφJSK O. S. Keay (what's his handle) of Local 219 along with L. L. (Slim) Kilbourne of Canadian Local 622 came through and made the "Worked 10 IA-IP Award" with plenty of extra ones on the list too. All of these boys are very close to the Gold Award, so we better watch out for them.

Quite a few letters from you CW men, especially who are on 40 meters. Particularly one from W6BHV Bill Thompson of nearby Chico Local 501 suggests that maybe the gang could pass on the dope as to what bands they work so as to make it a bit easier to get the awards. Well, this is pretty hard to do as most of the boys usually work the bands that are open at the time, CW or Phone . . . but if any of you CW men care to let me know your bands I will pass the dope along to those interested. Speaking of CW let's not sell out the new 21 MC band, it's really hot. I try to be on it often and it paid off the other day with a VQ4 contact in Naroabi. Not an IA one but still FB.

Calling Frequencies

The official calling frequencies are again listed here, approximate only—3950, 7050, 14,250, 28,700 and temporarily, until we hear from you if OK, 21,050.

Again let me remind you that the 1952 IA-IP contest closes in December and will have three classifications, so a lot of us will have good chances at those FB prizes. Keep your logs rolling to me so they don't all pile up as they did recently, and remember the other IA man's Local number is a MUST . . . his call, local, name and date. No QSL cards necessary. We'll keep score on this end for you if you like and add the ones on as you shoot them to us.

73 Gang CU on the air.

Tv Seen Turning to Film

"Feature films are one of television's best buys today and will probably remain so for a long time," George T. Shupert, vice president of Peerless Television Productions, Inc., told the 48th annual convention of the Advertising Federation of America. The traditional Tv controversy over live presentation vs. film presentation seems to be settling itself more and more in favor of the celluloid, Shupert believes.

One reason is the time difference involved in a national presentation, which is best met by putting the show on film and projecting it in each zone at the most favorable hour for that zone. Another is the cost factor; a recent survey showing that an advertiser can spot a half-hour projected film show over 39 local stations for 19 per cent less than the cost of network presentation over the same stations, using live talent.

Further, as new Tv stations are opened and present local monopolies become a thing of the past, increased competition will put a new premium on lower costs and additionally enhance the advantage of film, Shupert declared.

Warner's Profits Down

Profits of Warner's and subsidiaries for the nine months ending May 31st are reported substantially lower than for the corresponding period of 1950-51. Net earnings were only 4.958 million dollars as against 5.808 millions for the initial nine months of the previous fiscal year. Moreover, more than 1 million dollars of the current earnings resulted from sale of capital assets, while in the previous period less than ½ million dollars was gained in that way; tax provisions this year was lower, being 5.1 millions against the previous 5.8 millions; and the current contingency appropriation is also smaller than that of the previous year. Had those expenses remained at the previous level the current profit would have been more in the nature of 3.6 millions than 4.9.

Photographic Calculator

A photographic slide rule designed to calculate depth of field, field of view, aperture scales, film speed per second, hyperfocal distance, and filter and other factors has been placed on the market by Florman & Babb of New York. It comes in two models, one for 35-mm film and the other for 16-mm and 8-mm films. Price is $3.95 including complete instruction manual.

Kodak Sales, Profits, Lower

Eastman Kodak Company reports that for the first six months of 1952 sales were about two percent less than for the same period of 1951, and net earnings about 20 percent less. Sales, both years, were in the vicinity of a quarter of a billion dollars for the six-month period, and net profits in the vicinity of 20 million dollars. Employment was at an all-time high with 51,500 employes in the United States. The company currently has 75,000 shareholders.

Canada's Grosses at Record High

Canadian theatres are continuing to break box-office records, according to a report released by Nathan D. Golden of the U. S. Department of Commerce. Receipts have been steadily increasing since 1945, the report says; touched $86,700,000 Canadian in 1950 and are expected to reach a record $100 million Canadian in 1952. However, there has as yet been no Tv in Canada except such as can be intercepted from U. S. stations; local telecasting is being inaugurated this month in Toronto and Montreal.

Total number of theatres in operation in the Dominion during the first half of 1952 is reported as 1,867 indoor houses and 89 drive-ins. [Accordingly, the Canadian theatre receipts are $7.00 per person against $8.50 per person in the U. S.; Canada has one theatre for each 7,000 population as against one for each 7,500 in the U. S.; and one drive-in for each 155,000 as against one for each 40,000 in the U. S.—IP]

Jim Frank Quits NPA

James Frank, Jr., deputy director of the Motion Picture and Photographic Products Division of the National Production Authority, has resigned that post to accept an executive sales position in New Orleans, Nathan D. Golden, director of the Division, announces. Frank has been associated with the motion picture industry for more than 20 years; he has been assistant to the Photophone sales manager of RCA and New York branch manager for National Theatre Supply, and has taken a prominent part in the activities of the Society of Motion Picture and Television Engineers.

16-mm LEADS SMPTE MEET

(*Continued from page* 17)

and field service. Field servicing is undertaken by persons or organizations who may belong in any one of three categories: namely, franchised dealers, service organizations independent of any dealer but operating under contract with one, and completely independent agents.

As to personnel: "Many of the older men have come from the motion picture theatre field and have had many years of experience in operating and maintaining 35-mm equipment," Wilson explained; others come from the radio, television or public address fields, or received some training in equipment maintenance while serving with the armed forces. In some cases engineering students undertake such work on a part-time basis.

Ampro cooperates with service personnel who have accepted specific training in maintenance of the company's equipment, Wilson explained. Factory-sponsored schools are maintained both at the Chicago plant and at a number of other locations; if attendance at these schools is not convenient, training may be obtained by working in the Chicago or New York service departments. Such training is supplemented by manuals, bulletins and other appropriate information, as required.

Bell & Howell's service manager, O. T. Bright, in a paper describing his company's service arrangements, notes that B. & H. requires "service station personnel be factory trained before under-

taking any major repair work" on the company's products. Classes are conducted at Chicago and at branch office service departments; they are limited to five men each to assure highly personalized instruction, and last two weeks.

B. & H. authorized service stations are supplied with complete service manuals containing full instructions for disassembly, reassembly and adjustment, exploded isometric drawings and detailed parts lists. The service station is expected to invest between one and three thousand dollars in equipment, including lathe, drill press, power grinder, buffer, volt-ohmmeter, oscilloscope, signal generator, vacuum tube voltmeter, regulated power supply, condenser tester and dynamic tube tester. Jigs and gauges are supplied by B. & H., but the service station is required to maintain a representative stock of spare parts.

Test Reels

Test reels, developed cooperatively by the SMPTE and Motion Picture Research Council for more accurate servicing of 16-mm equipment, were described in a joint paper presented by Fred Whitney of the SMPTE, and R. A. House of the film recording group of RCA, Camden.

These films are designed to test: projector speed, sound optical assembly adjustment; alignment of sound optical assembly with scanning light beam; uniformity of scanning beam illumination; flutter content; frequency response; system gain (at 400 cycles); travel ghost, picture steadiness, and conformity of picture and sound quality to known standards.

Not all films necessary for these tests are currently available, however; some are still under development. They are being produced by laboratories using equipment of the highest existing accuracy. A more complete description of them, and of the recommended methods of using them in maintaining and repairing 16-mm sound projectors, will appear in IP in an early issue—under SMPTE rules the complete paper cannot be reproduced in these pages for the time being.

THEATRE TV GROSSES $400,000

(*Continued from page 12*)

drawing power of an event of this kind, shown in theatres, is obviously not fairly represented by a hundred thousand spectators or a gross of one-half million dollars since whole blocks of States could not get it at all. In the States where the program was available only a few cities at most could show it, and in those cities only a few theatres—seven in all of New York City!

Of the four theatres in Pittsburgh, Penna., that are equipped for large-screen television only two, the Harris and the Stanley, put it on. Anticipating these difficulties in the way of complete coverage, Nathan Halpern, president of Theatre Network Television, Inc., agents for the showing, guaranteed a minimum of no more than $120,000 to the International Boxing Club; but he looks forward to very different guarantees in such affairs in the future once large numbers of theatres are equipped to handle them and transmission facilities have become both more available and less expensive.

Meanwhile, in upstate New York, where Fabian's Grand Theatre, Albany, had booked the showing and sold admissions in advance at $3.60 each, counterfeiters forged similar-looking tickets and sold them, both in Albany and nearby communities, at $2 each. Local police, the FBI, and the Bureau of Internal Revenue patrolled the theatre lobby the evening of the 23rd scrutinizing every ticket. The fraud, luckily, had been discovered in time, and warnings to the public had been broadcast. Little harm was done and there was no disturbance in the lobby, but one Albany observer commented: "If we've got to the point where counterfeiters go to work on us, it looks like theatre television has arrived."

CINERAMA

(*Continued from page* 24)

there were so many other flaws in the picture, as already described, that perhaps flicker, if there were any, went unnoticed.)

Among other devices in the projector not evident in the illustration is one called the "jiggilo"—a vibrating sawtooth inside the head which has the function of blurring the projected image of that edge of each film which must be merged with another on the screen—that is, the center projector needs two "jiggilos" and the side projectors only one each. The sharp division between one film and its neighbor is thus obscured in the merged triple image.

Sometimes, as stated, the merger zones are not perceptible, while at others vertical stripes down the picture represent the blurring areas. Even when merging itself is perfect, however, the discrepancy in brilliance and color tone of the three arcs, and the disparate projector jumps of the three films, still remain to testify that this unity is not one but three.

The Screen

The screen is neither solid nor perforated, but built up of 1100 separate strips of perforated plastic tape. This is necessary because of the semi-circular shape, for if the screen were conventional light would reflect across it from one side to the other. The ribbed construction, resembling in a general way a venetian blind set vertically, prevents one side of the screen illuminating the other with reflected light. Looking out from behind the screen at some angles it is in effect fairly translucent, as the accompanying photograph shows; but viewed from in front as the audience sees it it appears absolutely solid.

The vertical strips are mounted, as the photograph also shows, in front of a rigid metal framework that determines the overall dimensions and curvature.

Entirely independent of its use in Cinerama, or of curving screens in general, this ribbed structure might possibly prove valuable for standard theatre projection. If an ordinary flat screen were similarly built the ribbed arrangement would eliminate need for sound perforations, since sound transmission would, of course, take place through the slots between the ribs. And if ribs were suitably disposed in front of a flat instead of a curving framework, light (traveling in straight lines) would not be lost but reflected to the audience; and the light loss resulting from perforations in existing screens thus corrected.

Sound transmission would be improved at the same time. The transmission area provided by the slots between the ribs in the accompanying illustration is self-evidently far more generous than that afforded by the perforations of a conventional screen. Cinerama people claim a tonal response of from 30 to 15,000 cycles, as contrasted with the 80 to 8,000 cycles, or thereabouts, of ordinary theatre sound. The structure of their screen is doubtless a contributing factor in enabling them to put so wide a range into an auditorium.

RCA Sound for Water Spectacle

A total of 720 watts of sound, derived from 50 microphones, is supplied to the 8,000 spectators of the musical-marine spectacle "A Night in Venice" by recently-installed RCA equipment. The spectacle, staged by producer Michael Todd, consists of musical extravaganzas and water carnivals, with a cast of over 300. The stadium, overlooking Zack's Bay, Jones Beach (Long Island, N. Y.), is provided by the State of New York through its Long Island Park Commission.

A total of 50 microphones, each with its own individual amplifier and volume control, are wired to a master mixer console. The output of this unit is delivered to twelve 60-watt power amplifiers and thence to the loudspeakers.

An outstanding feature of this high-fidelity system, in the opinion of audio technicians, is that acoustic feedback has been effectively overcome in spite of the high level output, the sensitivity of the "footlight" microphones, and the well-known tendency of a water-surface to reflect loudspeaker sound back into the mikes.

SAFETY FILM: PERFORMANCE CHARACTERISTICS

(*Continued from page* 8)

that no noticeable flutter existed and no changes in focus except for occasional focus-drift compensation were required, for even the most wavy high-acetyl safety prints.

Film Types and Buckling

It is a fact well-known to film technologists that high-acetyl safety film buckles much less readily than nitrate film. If we projectionists declare that the high-acetyl film buckles more readily, the scientists who really know about these things will regard our statement with amazement.

Buckling is caused by the edges of the film shrinking more than does the middle area. This always occurs when nitrate films are projected by means of powerful arcs which unavoidably make the entire gate very hot while projection is in progress. The film base, itself, is heated to a higher temperature by the hot film runners and tension pads than by direct irradiation in the aperture, which heats the emulsion but leaves the base relatively cool. It is very much as though we ironed the edges of the film with a hot iron without touching the middle.

The only way effectively to minimize this permanent deformation of the film is to use "cold" projectors or machines having gates water-cooled in a similar manner. Projectors having only air-cooling of the aperture or heat-filters in the arc beam simply cannot do the job.

The very superior resistance of high-acetyl safety film to buckling is due primarily to its much greater resistance to heat. Tests have been conducted under scientifically-controlled conditions which prove conclusively that high-acetyl film base retains its original propreties under heat conditions that cause nitrate film to lose its tensile strength and become so brittle that it shatters.

Because the low shrinkage characteristics of high-acetyl base are maintained under conditions that cause the edges of nitrate film to shrink much more rapidly than the middle areas, high-acetyl film is very resistant to buckling.

Since using prevue trailers printed on high-acetyl stock, the writer has been spared some of the characteristic troubles associated with reels of film made up by splicing a number of small rolls together. Sound level still frequently varies from roll to roll, but that has nothing to do with the film base. With the exception of a slight change of focus from roll to roll (due, in part, to several changes from black-and-white to color) there has been none of the rapid in-and-out of focus flutter sometimes seen during the first four or five runs of new nitrate ad trailers *which had been tightly wound in small rolls immediately after processing.* Nitrate film takes a curl and holds it tenaciously. Safety film takes a curl, but loses it when held in the gate of the projector.

Film Types and Side-Blurring

One projectionist interviewed claimed that safety film resulted in a picture having a blurred area along the right-hand side of the screen, while nitrate film permitted a sharp focus all over the screen (Simplex E-7 projectors). Although I did not see a nitrate print projected during my brief visit to that theatre, what the projectionist had said about the blurry right-hand side of the picture was true, and it occurred with both projectors when safety film was run.

In cases of this nature the condition of the film-gate runners is usually suspect. Uneven gate tension may also be involved. In mechanisms employing "studio guides" for edge-guiding prints through the gate the flatness of the film-runners cannot be checked without first removing the guide strips, an operation too delicate and time-consuming to be done during a show.

I kept the matter in mind, hoping that I might sometime encounter the same condition in another theatre. That wish materialized in one of the first theatres on my list. There it was, worse than ever, the blurry right-hand side of the picture which was blamed on safety film. But the fact that only one of my projectors

(Super Simplex) gave a blur on the right side of the screen simplified the problem. No matter how much the film contributed to the defect, the *basic* cause of the trouble lay in the projector, not in the film!

I kept both machines clean and properly lubricated, but I made no attempt to cure the trouble until a few nitrate prints came along. So, having projected both nitrate and safety prints in that theatre, I was able to make comparative tests—not in the sense of scientific analysis with mathematical excursions into resolving power, but merely visually. Any projectionist needs only to look at a picture to be able to tell if something is wrong with it.

These comparative tests revealed that side-blurring on the "bad" projector was definitely worse with fairly new safety film than it was with nitrate prints old enough to be junked. The complaint, therefore, was not entirely wrong. Safety prints aggravated the blurring of the right-hand side of the picture; but when nitrate prints were shown, whether old reissues or "green" newsreels, the defect, while visible, was too small to interfere seriously with the focus.

On the "good" projector, however, both types of film allowed a satisfactorily uniform focus, except that the safety-film prints were easier to focus and keep in focus on this projector than were the nitrate prints. Some of the nitrate prints were badly buckled and shrunken, giving poor results on the screen. There were also in-and-out of focus effects with the nitrate prints which demanded constant vigilance at the focusing knob. Overall, the picture-quality obtained with old nitrate prints was appreciably worse, in general, than that which I have encountered with safety film, old or new. Allowances must be made, of course, for an occasional bad printing or processing job.

Examination of the gate film-runner disclosed two deep hollows on each side, and several smaller hollows on one of the runners of the "bad" projector. Gate tension was also uneven, tending to throw the film to one side, and the pads, themselves, were in poor condition.

The hollows in the film-runners were detected by holding an accurate tool-steel straight-edge against them and shining a flashlight on the main-frame casting behind them.

On standard soundfilm, the pictures are not centered on the film, but are positioned closer to one edge of the film than to the other. The soundtrack has robbed the standard "silent" frame of about 1/10 of an inch of its width.

Now, if the gate be faulty, distorting the film and twisting it a few hundredths of an inch one way or the other, a blurry *right-hand* edge of the projected picture is likely to result. Why the *right-hand edge?* If the same degree of distortion exist on the soundtrack side of the film—and it usually does in these cases—we seldom see it on the left-hand side of the screen picture because the soundtrack area in which most of the distortion occurs is marked off, and hence does not appear on the screen.

If the silent frame and picture-aperture were in use today, we should notice an approximately *equal* amount of blurring on *both* the right- and the left-hand sides of the screen. "Silent" film frames were exactly centered on the film laterally. This explanation leaves no doubt why the right-hand area of the screen image begins to look bad when the film-gate becomes worn and uneven.

Safety film, having a lower "Young's modulus" than even fresh nitrate film, is accordingly more supple and easily twisted, and more readily bent and "pincushioned" by the heat of the arc beam than is nitrate film. Although these deformations are transient in safety film—the film springing back into shape again when the stress is removed—it explains why the blurred-edge trouble is usually greater with safety film.

This trouble can be totally prevented by replacing film-runners and tension-pads the moment they show signs of wear, and also keeping the pad tension—no matter how high or how low you like to have it—perfectly even, the same on both sides. The effects of hardened emulsion gumming up the film runners may also be deleterious.

[TO BE CONTINUED]

Tv for Industrial Supervision

Supervision by television over "remote, inaccessible or hazardous operations in areas where human observers cannot be stationed" is provided by a new, low-cost industrial television system just announced by RCA. The equipment utilizes only 22 tubes, one of these being a new 1" x 6" camera tube, and another a 10" viewing tube. The scene to be viewed is transmitted over cable, although for long-distance supervision microwave radio may be substituted. By means of multiple cameras and receivers a single observer can monitor a number of scenes simultaneously. Other auxiliary equipment permits close-ups to be enlarged and projected for convenient viewing by large groups.

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Showmanship can be put into 16-mm presentations by opening and closing screen curtains in theatre-style, and such curtain operation can be remote-controlled by suitable equipment just as in theatres, Vallen, Inc., points out. A Vallen "Junior" curtain control weighs less than 100 pounds and occupies less than one cubic foot of space, the company notes. Other equipment by the same maker provides round-the-corner, rear-fold and panoramic curtain operation to solve almost any conceivable problem of stagecraft, in small or large auditoriums.

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INTERNATIONAL PROJECTIONIST

NOVEMBER 1952

VOLUME 27 • NUMBER 11

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With Which Is Combined PROJECTION ENGINEERING

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AARON NADELL, *Editor*

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MONTHLY CHAT

THREE months ago the International alliance held its 41st Convention in Minneapolis. This month no less than three other industry organizations convene, in Chicago. These are the Allied States Association of Motion Picture Exhibitors, the Theatre Equipment and Supply Manufacturers Association, and the Theatre Equipment Dealers Association. They are holding a triple convention and joint equipment exhibition.

These friendly gatherings of competitors, rivals and opponents are increasingly typical of American industries. At Minneapolis last August the IA invited to its rostrum and microphone outstanding representatives of those employers with whom on other occasions IA officials negotiate to the last inch. Some of these employers and employer representatives, who felt they had a message, came of their own accord without invitation to the IA Convention and were freely invited in and handed the microphone in all cordiality.

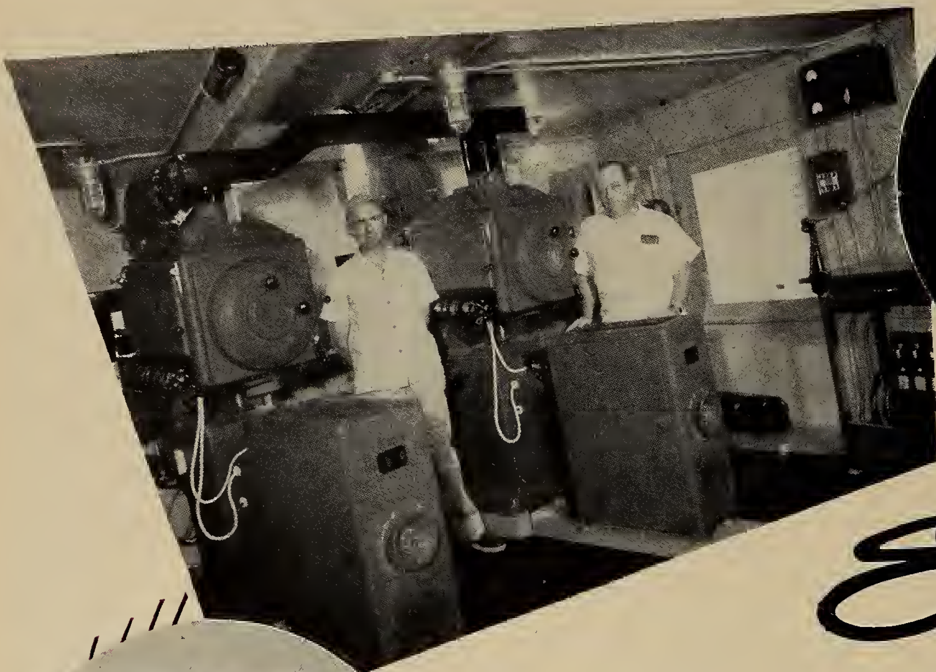
This month in Chicago othertime rivals, determined competitors for the favor of the theatreman and the projectionist, will meet at the same cocktail party and banquet, dance with each other's ladies, and in general comport themselves as members of an industry inside of which differences and quarrels are all in the family.

Behind the organizations that make such gatherings possible there is always a man, or at most a few men, who do the work. Behind the Theatre Equipment and Supply Manufacturers Association (TESMA) there is, and has been since 1945, Roy Boomer, who serves as continuous secretary while elected presidents come and go; who organizes, oversees, fosters, pushes and drives at a thousand separate points until at last all the wheels run in harmony. Behind the Theatre Equipment Dealers Association (TEDA) is its executive secretary, Ray Colvin.

At these joint trade shows (TESMA and TEDA have been meeting jointly since 1946) substantially all manufacturers of theatre equipment, including projection room equipment, put on exhibition their best and latest models, with their senior salesmen in attendance. Hundreds of projectionists, as well as theatre owners and managers, stroll the aisles, examine the apparatus displayed, ask questions, collect literature. Always a few of the smaller exhibit booths are occupied by working projectionists who have invented some device or improvement and show it at these gatherings in expectation of finding buyers or arousing interest.

IP readers who will be in or near Chicago November 15th to 19th will find almost the whole of their industry on display at the Morrison Hotel; the latest equipment and apparatus for the theatre spread out for their inspection with experts on hand to explain it; and some hundreds of their fellow craftsmen crowding the aisles. We advise those who can. to go.

Year in . . . Year out



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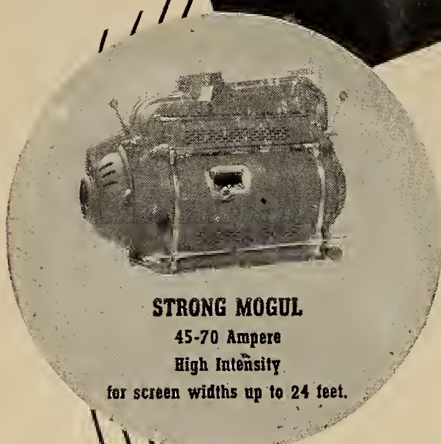

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VOLUME XXVII NOVEMBER 1952 NUMBER 11

Safety Film: Performance Characteristics

PART II

By ROBERT A. MITCHELL

It is an evident fact that safety film theatre release prints are here to stay, come what may, and it is in the best traditions of the projectionist craft that it use this film stock so as to achieve the best possible picture quality on the screen. This is no more and no less than an enlightened, an alert and intelligent self-interest.

WHAT about splicing? Many projectionists interviewed by the writer within recent months still would rather make half a dozen nitrate splices than one safety splice. In some cases I really believe that the trouble was psychological—if the projectionist had been unaware of the fact that he was splicing a different kind of film with a different kind of film cement, he would have experienced no difficulties at all. This is not to say that difficulties in splicing safety film are purely imaginary, for that would not be true.

Some projectionists are inclined to hoard film cement as though it were liquid from the fountain of youth. That's bad for two reasons. First, nearly all cements deteriorate with age, as air, moisture, and dirt get at them. Second, some of the earlier safety and "double-purpose" film cements actually weren't much good anyway. They worked with nitrate film, but were not very effective when applied to safety film. So keep in mind that within the past few years a number of changes have been made in the film-cement field. Ever hear about Film-Weld, Ethyloid, and Jefrona all-purpose cements? They are advertised in IP. Why not give them a try?

Splicing Problems

If the cement you are using takes too long to "set" the splice, or demands scraping even the blank side of the film, or gives a weak splice with safety film—then change your brand in a hurry! Some well-known brands are very slow-acting and yield splices of uncertain strength. Moreover, some are too thin in consistency to permit application of an adequate quantity *on the scraped stub where the cement is needed.*

The splicing of safety film has been discussed by various writers numberless times. Truth to tell, some of this advice sounds rather academic, and we wonder if it actually originated from practising projectionists. Our time is limited; and there are times when we cannot give each and every splice the same degree of attention demanded of a jeweller assigned to study and split a diamond. It's simply a question of how much time we can afford to devote to the repair of prints and the making up of "coming attractions" prevue stuff.

Some exhibitors have apparently never heard of the Emancipation Proclamation, and some of the ivory-tower boys just don't know what practical theatre projection is. With close shipping and shows starting at 2 p.m. or earlier, the average projectionist has good reason to dread a change of bill, especially when the exchanges have passed *their* undone work along to *him*.

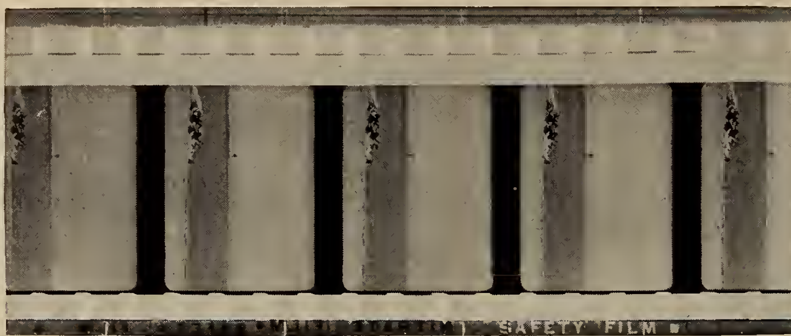
Splicing really begins with the identification of the film stock unless a *good* double-purpose safety-film cement is used. Such cements exist, and we are thankful to them for making it unnecessary to find out whether the film is nitrate, acetate, or a mixture of both. But to those projectionists who insist upon using nitrate cement for nitrate film and double-purpose cement (most brands of safety-film cement) for safety film alone, the problem of correctly identifying the type of film-base is very important.

Nitrate film is identified by the words NITRATE FILM printed at intervals along the edges, by lateral dashes printed as frame guides on the outer margins of the film, and by high inflammability. But since anything can be printed through to the release positive—manufacturers' identifications, footage numbers, print letters, and also the words NITRATE FILM and SAFETY FILM—anything at all from original negatives, master positives, and duplicate negatives—the only infallible proof of the nature of the base is to touch a lighted match to a clip from the print. If it burns like fury, it's nitrate. Or at least, the clip was.

Safety film is identified by the words SAFETY FILM or simply SAFETY at intervals along the edges. But, here again, these words may be print-throughs *onto nitrate stock*. So don't believe everything you read.

Double Check for Safety

Safety film of Eastman manufacture is framed-marked by longitudinal dashes between every fourth sprocket-hole. But don't trust these, either. I have before me on this desk samples of prints containing several varieties of dots and dashes, including squares, triangles and various other geometric hieroglyphs printed between the sprocket-holes. So try the flame test. If the film burns like paper, or merely melts and sizzles, it's safety film. Or at least that part of the print from which the clipping was taken was safety film. *As a matter of fact, the use of nitrate along with safety film can be extremely dangerous if the projec-*



A print on nitrate stock showing conflicting identifications printed through from a safety master positive and a safety duplicating negative.

tionist relaxes his vigil against the fire hazard.

For checking large reels made up of *Eastman Kodak film only*, the fluorescence test may be used. Eastman has introduced tiny amounts of normally invisible (clear) fluorescent materials into its safety base. When irradiated with "black light" (ultraviolet radiation with all visible wavelengths filtered out), Eastman high-acetyl safety film glows bright purple, whereas nitrate film appears black by comparison.

However, we also have Du Pont safety film to reckon with (which at present is similar to the Eastman high-acetyl film in this respect), and likewise Ansco Color safety base. In addition, large quantities of the Belgian Gevaert high-acetyl safety film seem to be floating about, and this is not always fluorescent. The German Agfa film, once a great favorite in this country because of its consistently high physical and photographic quality, is now almost exclusively a behind-the-iron-curtain product; so we need not worry about that except in very old prints.

The actual splicing of high-acetyl safety film is a simple matter when good cements are used. The only trouble is that it takes about twice as long for a safety splice to "set" solidly than it does for a nitrate splice. This is because high-acetyl base, practically the triacetate of cellulose, is very resistant to solvent liquids. Only a limited number of solvents attack it readily; and most of these are too poisonous to be used in the projection room. The projectionist not only breathes the fumes, but he usually gets a bit of the stuff on his fingers, where cuts and minor abrasions assist the obsorption of poisonous chemicals into the bloodstream. So the bad actors in the chemical family don't get into film-cement bottles.

Scraping the Splice

Proper scraping, however, assists the "setting." After scraping the stub in the usual manner, roughen the surface of the base, just as most projectionists have always done with nitrate film. Emery cloth of the finest grade may be used; and if the splice is afterward brushed with a clean piece of cloth, there isn't much danger of gritty particles getting into the projector. Some projectionists prefer razor blades; and this writer swears by a piece of beryllium copper ground to a razor-sharp edge.

Now, just what is the reason for roughening the stub? It increases the surface area enormously, providing more exposed base for the film-cement to act upon.

Most projectionists don't need this advice; but here we go again. Apply the cement you are using with one or two strokes of the brush—no more. Clamp and allow about 10 seconds for the splice to set. (Only 5 seconds are needed for nitrate film spliced with regular nitrate cement.) And if the splices seem to be especially slow in setting on certain chilly days, first warm up the splicing gadget on a hot radiator or with an electric heating unit (but remove the splicer from the rewind bench to do this).

Film Cements

This brings us up to the film-cement itself. What's it made of? How does it act on the film? To answer the last question first, a film-cement is merely a solvent which *dissolves* the film base. It acts upon the surfaces of the stubs and *welds* them together. It is not a glue. The film-base material itself is the glue. In practice, however, the solvent liquid (which may be composed of several solvent chemicals mixed together) may be thickened by dissolving a little of the proper film-base material in it—nitrate base in the case of nitrate film-cement, safety base in the case of safety film-cement, and safety base with a trace of nitrate base in an effective "double-purpose" film-cement.

Projectionists do not like a "thin" cement. If the cement is too watery, it does not remain on the stub where it has been applied, but runs off the edges of the film, or creeps underneath the film-holders to soften the film exactly where we don't want it softened. A syrupy consistency works best because the cement then sticks to the stub where applied and does not "soak up" half a frame of film. If *too* thick, however, the cement may not penetrate the stubs sufficiently to give a good weld.

High-acetyl Cements

High-acetyl safety-film cement is but a trifle more complicated in practice than nitrate cement because, while there are many simple and inexpensive solvents for nitrate base, only a few work well with high-acetyl base—and some of these are rather weird. In fact, a descriptive list of feasible triacetate solvents makes mighty short and dismal reading.

First, however, let's consider two very good solvents for nitrate base, *i.e.* banana oil and acetone. Banana oil (amyl acetate) has little or no effect on high-acetyl base. This chemical, therefore, should not be used in any cement intended for safety film. Acetone, even though failing to dissolve large quantities of safety base, softens it sufficiently to give weak to moderately strong safety splices. But splices made with pure acetone buckle so badly

An ultra-violet lamp used for examining a roll of film to determine whether it is on fluorescent-treated safety base. (Photographed with white light.)

and are so uncertain in strength as to be unfit for running through a projection machine.

The best practical solvent for high-acetyl base is a watery liquid called dioxane. Some scientists, especially in Europe, are inclined to regard dioxane as being too toxic to be slopped about in any except well-ventilated rooms. Film manufacturers, while agreeing that dioxane is mean stuff, pooh-pooh the notion that its use will harm projectionists. And the film manufacturers are probably right.

Dioxane has what is called by biochemists and pharmacologists a "low-grade" toxicity. It is probably less poisonous than wood (methyl) alcohol, carbon tetrachloride, and other toxic materials projectionists occasionally work with. Since most commercial safety-film cements contain dioxane (or ought to contain dioxane if they are to work properly), breathing the vapor of it and getting some on one's fingers is unavoidable. But so far not one case of dioxane poisoning has turned up in the theatre field.

Because dioxane has a rather high boiling-point (and also because it is somewhat expensive) more volatile solvents are mixed with it, reducing the dioxane-content down to about 50%, making a cement that is more rapid in action (and also lower in cost). These more volatile solvents may be, and ordinarily are, only partial solvents for cellulose triacetate, but in combination with dioxane they work excellently.

There are also *combinations* (rather than mixtures) of other solvents and partial solvents that may be incorporated into good safety-film cements.

High-acetyl base is quite soluble in chloroform. But for some strange reason, a splice made with pure chloroform is rather weak unless made under great pressure. Chloroform is, like dioxane, a poison; but we have never heard of anyone being poisoned by using film-cements containing it.

Amyl acetate, discussed just a moment ago, is an ester of amyl alcohol and acetic acid. There are many other liquids belonging to the class of simple esters; but the only common one that exerts an appreciable solvent action upon high-acetyl base is methyl acetate. This can be used as one of the ingredients of a film cement containing dioxane or other solvents.

The use of glacial acetic acid commends itself only when no regular safety-film cement is available. It sets quickly to form a moderately strong flat splice with high-acetyl safety film. It should *never* be considered as a satisfactory substitute for the best commercial cements, however. Its action can be improved by mixing other chemicals with it.

The highest cellulose acetate, the triacetate, is slowly soluble in cold glacial acetic acid, but rapidly soluble in the hot

This illustration shows a mixed roll of fluorescent-treated safety film (white) and untreated nitrate film (dark) on an exchange reel. (Photographed with an ultra-violet source.) The edge of the treated safety film is actually colored purple and the nitrate film black in ultra-violet light.

acid. At room temperatures the solvent action of glacial acetic acid for safety base is increased to an appreciable extent when certain other solvent liquids are mixed with it. Just as nitrate base is unaffected by either alcohol or ether alone, but is dissolved by a *mixture* of alcohol and ether, so high-acetyl safety base dissolves to a satisfactory degree in an acid splicing mixture such as glacial acetic acid, plus choloroform, plus acetone.

However, formulae that work extremely well with high-acetyl safety film are not always to be trusted with nitrate film. Chloroform, for example. has no effect at all on nitrate base.

The wearing quality of safety film seems to be a big bone of contention. A typical complaint runs somewhat like this:

Durability of Safety Film

"Take a look at this print. It's a fairly late release, and not a scratch on it; but the sprocket-holes are already badly cracked at the corners. It wasn't that way when we had nitrate prints. A nitrate film has to be practically run to death before perforation damage begins to show up."

Other complaints even involve contradictions. For example:

"Safety film is simply a manufacturer's scheme to make more money. Because it wears out more quickly than nitrate film, the distributor must order a greater number of prints of each picture. That means greater raw-stock sales."

That is one fellow's opinion. Another projectionist says:

"Safety film wears out before distributors can get a reasonable number of runs out of it. Instead of ordering more prints of each picture, the exchanges start bicycling prints to avoid repairing the worn-out prints themselves."

The writer cannot accept paradox as paradox any more than the reader can.

(*Continued on page* 27)

Underwriters' Bulletin on Cellulose Acetate Film

As a pendant to Robert A. Mitchell's discussion of nitrocellulose and cellulose acetate stock in this issue, IP here adds excerpts from National Board of Underwriters' "Special Interest Bulletin No. 283—Film, Motion Picture Cellulose Acetate." The repeated insistence, in this Bulletin, upon the importance of continuing to observe all customary safety precautions as long as nitrate film continues to circulate is particularly important to IP's readers.

FOLLOWING an extended investigation, acetate base film in the form of ribbon for motion pictures was listed by Underwriters' Laboratories Inc. as slow-burning, the fire hazard being classed as somewhat less than that of common newsprint paper in the same form and quantity. Motion picture safety film having a cellulose acetate base is now being marketed for commercial and general use. It is claimed that this film has a greater projection life and is otherwise superior as compared to the older type of cellulose acetate film.

This type of film may be identified by the words "Safety Film" printed at frequent intervals along the edge. In case of doubt, acetate film may be distinguished from nitrate by a burning test, using only a small piece of film, and burning it in a room where there is no film and no fire hazard. Nitrate film will burn fiercely; acetate film will burn quietly.

The ignition temperature of cellulose acetate is between 700 and 800° F., as compared to about 300° F., for cellulose nitrate. A temperature of about 500° F. is required to produce the decomposition of cellulose acetate film. In the neighborhood of this temperature the evolution of fumes in material quantity occurs. These fumes are irritating and suffocating, but not considered to be toxic under most conditions.

The decomposition of cellulose acetate film once started does not continue except under conditions where there is an external source of heat. On the contrary, in the case of cellulose nitrate film the decomposition continues when once started, even in the absence of external source of heat. This difference of decomposition is, therefore, of great im-

(*Continued on page* 34)

Theatre Tv, Stereo, Promise More Jobs

More equipment of diversified kinds, added to the projection room to create the new entertainment, will require more men to operate and maintain it, perhaps as many as six projectionists to a shift, and may lead to specialization in diverse projection skills. Willingness of the public to pay for this depends on the attractiveness of the resulting entertainment (they pay $2.80 now for Cinerama); ability to pay for it depends on the national prosperity.

By LEROY CHADBOURNE

THEATRE television is not "coming" but here; nearly a hundred American theatres have it installed. Cinerama is playing two-a-day to packed houses as this is written. Next month IP will report the audience reaction to polaroid-spectacle feature presentations about to be opened in two West Coast theatres.

Meanwhile, the opposition has a powerful counter-attack in readiness. The television industry has been more or less content to date to wrangle over the kind of color system to use for home receivers. As long as substantial regions of the country remained without telecasts, and continued to provide new markets for receivers as they were added to the net one by one, the Tv industry was reasonably happy. But that happiness is running out fast. Tv manufacturers will very soon face two alternatives: they must either make the American home a two-Tv home by selling black-and-white receivers at drastically lower prices, or agree on some system of color and start selling color receivers at pleasantly higher ones. Whichever they decide, the theatre can look forward to another box office slump because the customers will use their movie money to meet the Tv installments.

Counter-weapons readily available include theatre Tv, theatre color Tv, stereocinema, Cinerama, stereosound.

Which of these, or what combination of several of them, will prove most successful on trial, only experiment can tell; but how each of them can be expected to affect the projection room and the projectionist is much less obscure.

More Projectionists Needed

For example, there can be no reasonable doubt that projection rooms will have to be enlarged (to accomodate additional apparatus) and very little doubt that a larger number of projectionists will be needed to take care of the additional work. Cinerama, for example, uses three separate projection rooms. Film-intermediate theatre Tv needs a photographic-and-developing space in addition to a projection room. Needs of stereocinema depend in part on the system used, but the most effective method calls for four projectors instead of two. Stereosound as currently known calls for two additional amplifying channels, an additional film carrying soundtracks only, and an additional soundhead for playing that film.

If not merely one, but two or three, of these innovations are added to the same theatre, and used alternately, in order to provide a variety of strong box office appeals, a projection room might conceivably be equipped with four mechanisms, for stereocinema; a fifth (soundhead only) for stereosound; and have a photographic-and-developing room adjoining for film-intermediate Tv—plus possibly still other features. It is only reasonable to anticipate that additions to the previous projection staff will be needed in proportion: and not only for operation but also for competent maintenance of so large an investment in machinery.

Specialization in Skills

Increase in the size of the projection staff, and growing diversity of projection room equipment, must inevitably lead to increasing specialization—and this trend undoubtedly will extend even to the servicing companies. No man can be an expert in many things. Diversity implies specialization. Even today a servicing company inspector who runs into an unusually obstinate trouble may call in a colleague to help him; in the near future the visiting service inspector may correspond to a general practitioner, whose business it will be to administer routine medication and to determine when the condition is one that calls for a specialist.

Among the members of an enlarged projection staff specialization can be expected to appear naturally and spontaneously. If one man has an inherent preference for the mechanics of the projector head and another for the electronics of the Tv circuits each will gravitate toward the work he does best and other members of the projection staff will tend to pass on that particular work to him.

Manpower Requirements

Enlarged projection staffs exist now, and have for years, in the great metropolitan theatres. There can be found, and could be found these many years past, competent all-around projectionists who in addition are especially competent in some one phase of projection. Where such specialized competence is outstanding its possessor, by general consent, undertakes such work and collects the overtime when a need for his particular talent appears.

If and as theatre Tv, stereoprojection, and other new box office magnets come into wide-spread use, the enlarged projection staffs and specialized competences now found only in large metropolitan theatres may become general practice throughout the country—at least the trend and pressures will be in that direction.

Specific requirements of each of these possible or probable innovations, such as theatre Tv, stereoprojection, etc., are now known in considerable detail and can be outlined with reasonable accuracy. Factors not yet decided, however, or not at the moment reducible to figures, include among others: the supply of competent manpower available; the manpower staffing policies to be advocated in the future by the IA and determined by process of bargaining; and above all the economics of theatre budgets, which in turn involves the basic question of how much the public will be willing to pay to be entertained by these new mechanisms. Despite these latter uncertainties definite and inflexible factors none the less remain, such as the fact that one man cannot be in two places at the same time, and therefore the recently-developed entertainment machinery is going to require the services of a minimum personnel or else cannot be used. Theatre Tv, stereoprojection, Cinerama and stereosound each impose, in

Dr. Goldsmith to Advise RKO

Dr. Alfred N. Goldsmith, pioneer radio and talking picture engineer and "elder statesman" of this industry, has been retained as technical consultant-adviser by RKO Theatres. He will study and recommend "such measures as will increase the attractiveness of the theatre motion-picture screen to the American public," Dr. Goldsmith tells IP, adding: "I remain of the opinion that well-run and attractive theatres, presenting films of high quality, are a permanent and profitable portion of American life. A variety of types of competitive entertainment is stimulating and it is certainly to be hoped (and believed) that the theatres of America will continue to supply programs which will appeal to, and hold, the attention and support of the public."

Concrete steps toward using all the resources of technology to enhance the attractiveness of theatre screen presentations will constitute Dr. Goldsmith's latest contribution to this industry through this new connection with RKO.

their present state of development, certain unavoidable manpower requirements.

These requirements necessarily extend beyond the theatre to the supply dealer and service company. If there is more equipment in the average projection room the service company either must send more than one man to inspect it or, if one man does it all, grant him a longer period of time per average visit. In either case, the service companies will need enlarged staffs. Since they face this need, owing to the existence of a larger number of items of equipment to be inspected and maintained, they must charge a higher fee. The supply dealer, carrying a more varied inventory, and faced with the same need for increased personnel and increasingly diversified skills as the projection room itself, will not necessarily charge a higher price per item, but he will sell the theatre a larger number of items. He will do more business and need a larger staff accordingly.

Advent of technical innovations in the projection room should therefore increase employment opportunities offered by service companies and supply dealers as well as opportunities in the theatre.

Theatre personnel requirements resulting from installation of new and more varied equipment, considered only from the point of view of known equipment needs and without regard to available manpower, IA policies, or theatre budgets, may be summarized approximately as follows.

Three general types of theatre television equipment exist, with varying requirements as to personnel. These are: direct projection, film-intermediate, and Eidophor.

For Theatre Television

Direct-projection systems as currently installed and used in dozens of projection rooms have been and are operated successfully by standard two-man crews. In a one-man projection room they could not very well be used unless a second man were added, owing to the need for continuous monitoring to maintain image quality and minimize any chance of interruption.

Interruption on Tv (it cannot be stressed too often) is beyond comparison more serious than with film. Film, at worst, can be rethreaded and run again; the entertainment is impaired, but not lost. But the knock-out punch or ninth inning home run a Tv audience misses cannot be shown to them two minutes later—it's lost. And that climax is what they paid to see.

One man must monitor the Tv show at all times and therefore another must be available to rewind, thread up, trim the lamp and otherwise prepare for the film show to follow—unless, in some distant day, the theatre goes all-Tv, which is very nearly impossible, owing to the fantastically large quantities of program material that would be needed.

Film-intermediate Tv involves a separate room (or equivalent floor space) equipped with a Tv receiver, motion picture camera and recorder, frame frequency converter (from 30-frames-per-second to 24-frames-per-second) and developing machine. This equipment needs attendance. The developer solutions must be prepared, loaded and changed. Film must be threaded through the long and highly intricate film path. Operation of all these apparatus items must be supervised and adjusted from time to time as the show proceeds.

Simple maintenance duties, of elementary nature not justifying calling in a service man, must be carried out, and the whole performance of the installation watched by an attendant who is competent to determine when a service inspector's help is needed. None of these functions can be exercised by the regular projection crew because they are and remain at their normal posts in the projection room. One, at a minimum, additional projectionist, will be needed, and much more probably, two.

Eidophor Tv is directly projected, but involves additional apparatus items not found in other direct-projection systems. These include the refrigerator and the vacuum pump. How much attention these will need in routine daily operation only such operation can determine with finality, but as a probability one additional man should be required. The indeterminate factor here lies with the "bugs" that do not show up when one laboratory model is operated under expert engineering supervision, but appear later when a hundred models are working in a hundred theatres under supervision of craftsmen whose abilities are a step below those of an engineer.

Since Eidophor does include, in general, all the equipment items incorporated in other direct projection Tv's, plus some peculiar to itself; and since other direct projection videos require a two-projectionist projection room, Eidophor will need between two and three projectionists—perhaps three at the beginning and two later on after time has eliminated the bugs.

Stereoprojection

Although several systems of stereoprojection are mooted, only the polaroid-spectacle variety will be considered here. A resume of the various proposed meth-

(*Continued on page* 28)

A British Reaction to the RCA Synchroscreen

R. Howard Cricks, technical consultant to *Ideal Kinema* of London, offers in the October 9th issue of that publication this British reaction to the RCA Synchroscreen and his view of its desirability in motion picture theatres.

"A NEW style shop window for the picture" was the description applied by A. Smith Harkness to the RCA "Synchroscreen," which is installed at the Queen's, Bayswater. The screen—the invention of Ben Schlanger—is to be handled in this country, as in America, by RCA, and is to be manufactured by Andrew Smith Harkness; makers of the "Westone" screen.

As previously described, the principle of the Synchroscreen is simply that wings on both sides of the screen, and top and bottom of it, made of the same screen material, are dimly illuminated by re-reflected light from the picture. The picture is thus framed by a border, the intensity and color of which vary synchronously with those of the picture.

The construction is exceedingly simple. Panels are arranged at the correct angles on the sides, top and bottom of the screen. In America, the frames are made of wood, but for this country angle iron has been used.

At a demonstration last month, we saw a couple of reels of an American musical, a Pathé newsreel, and part of "Happy-Go-Lovely." I would naturally not describe the effect as stereoscopic, but it was generally agreed that the picture gained an appearance of depth, particularly when the camera trucked towards the set. In a black-and-white film the effect seemed to be more pronounced than in color.

The effect would be still further enhanced if it could be arranged for the brightness of the surround to fall off towards the outer edges, so vignetting the picture and its surround. But this would ideally necessitate curved panels, although probably the cheaper method of painting the edges of the wings would give a similar effect.

A point I noticed at the start of the demonstration was that as the tabs opened on the screen the whole structure of the surround was revealed by the color-flooding. Flooding should be restricted to the actual screen area—which, of course, would mean that it must be done by spotlights, and not by floats and battens.

To summarize, in my view the "Synchroscreen" would be an asset to any kinema.

One must accept the views of ophthalmologists and lighting engineers that a black surround is conducive to eye-strain. But the chief argument in favor of the new screen is that it is something new in picture presentation and enhances the standard of projection.

Transistor—Successor to the Vacuum Tube?

Doing much the same work as the amplifier tube and photelectric cell, the transistor now is being produced in quantity and with production line uniformity of operating characteristics. Its use in the theatre may make three-dimensional sound economically feasible for even the smallest house, and in addition eliminate or minimize many present causes of sound trouble.

TRANSISTOR is the name given to a device, first announced in crude form in 1948 but now improved and entering into mass production, that promises to replace the vacuum tube in many applications and do a better job.

Theatre sound equipment built around transistors instead of vacuum tubes should be less subject to trouble, very much more compact, and less expensive. With transistors, the cost and complexity of triple-channel amplification for three-dimensional sound should be substantially reduced. For ordinary sound, the reduced cost and complexity suggest that each projector may have its own amplifier and this arrangement, with emergency changeover switch, could provide every theatre with the protection of a dual amplifying channel.

However, costs for theatre-type equipments are not yet determined at this time of writing; for the present, only probabilities exist.

Since the transistor, unlike the vacuum tube, is not microphonic to mechanical vibration, such amplifiers could readily be mounted on their respective soundheads. Because transistors have no cathodes in the conventional sense and do not develop substantial quantities of heat in operation they, and their associated amplifier components, can be sealed hermetically and so made impervious to lubricating oil.

Transistors can perform most of the functions of vacuum tubes. Specifically, they can function as amplifiers, not only at sound frequencies but also, with suitable circuitry, up to one megacycle per second. They can therefore serve many (although not all) television amplifier requirements. Transistors, like vacuum tubes, can be connected as oscillators, generating alternating current over a wide range of frequencies. The phototransistor is a variety responsive to light, including rapidly fluctuating light, and could conceivably replace the PEC in theatre sound equipment if the magnetic soundtrack does not displace it first.

Use of the transistor in theatre equipment, however, may be delayed because of the many other, more vital, services it can perform in other fields. For many military purposes it is extremely valuable; small size, light weight, absence of surplus heat in operation, absence of an A battery, make the transistor practically ideal for walkie-talkies on the one hand; and on the other, for highly complex electronic installations, where hundreds or thousands of tubes (and their A circuits) can be replaced by an equivalent number of incomparably smaller transistors with no A circuits and no surplus heat to be dissipated.

The transistor also is ideal for hearing aids. For commercial airline electronics, for radar, for portable radios and other applications, the transistor also holds out great promise; and the theatre may have to wait accordingly.

Background of the Transistor

The conventional vacuum tube, it will be remembered, developed out of the two-element or rectifier tube, originally known as the "Fleming valve." After ex-

FIG. 1. One form of transistor. This tiny unit yields an amplification of 100 (20 decibels).

tensive study of the two-element tube and many experiments, de Forest added the grid and so produced the first three-element or amplifying tube.

In somewhat the same way the transistor grew out of extensive study of "semi-conductors" and many experiments with them. The new de Forests are John Bardeen, W. H. Brattain and William Shockley of Bell Telephone Laboratories.

Projectionists are familiar with semi-conductors and use them daily. The carbon of arc lamp carbons is so very "semi" as a conductor that it is often copper-coated to prevent excessive waste of power in the few inches that separate the arc from the jaws. Copper, of course, is a good conductor, but when it is tarnished by atmospheric gases into copper oxide or copper sulphide it loses its conductivity; the oxide and sulphide of copper are semi-conductors. They are one-way conductors; both copper oxide and copper sulphide have been used exten-

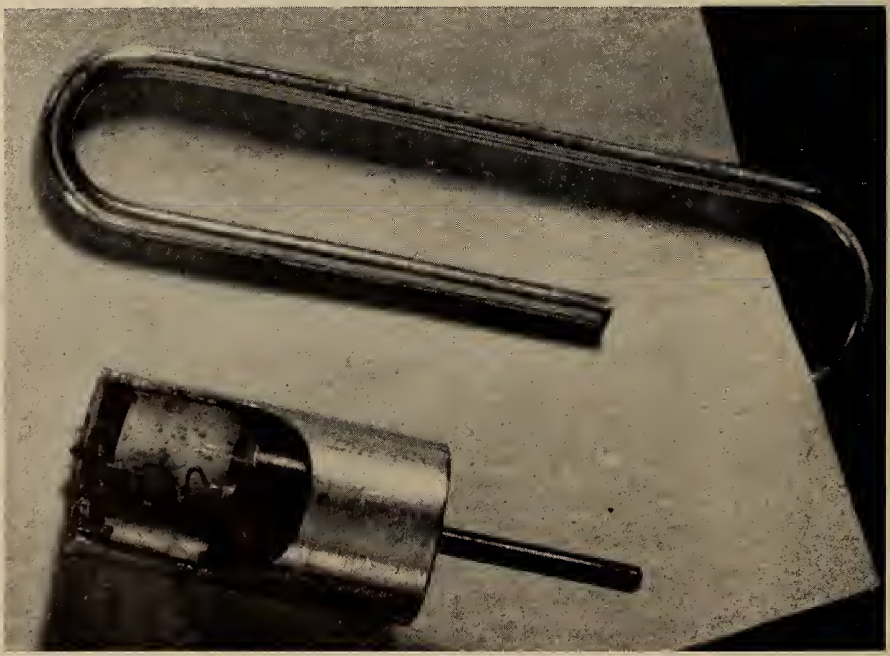


FIG. 2. Phototransistor, an entirely different type of photocell, photographed with a common paper clip to show its size.

SEEING IS BELIEVING!

THE BIRTH OF A NATION AND THE BIRTH OF AN ART

IN 1915
MOTION PICTURES GRADUATED FROM FASCINATING NOVELTY TO INTERNATIONALLY RECOGNIZED ART-FORM WITH RELEASE OF D.W. GRIFFITH'S
"BIRTH OF A NATION".
BIG BOX OFFICE WAS BORN, TOO. THE FILM HAS GROSSED OVER
15 MILLION DOLLARS!

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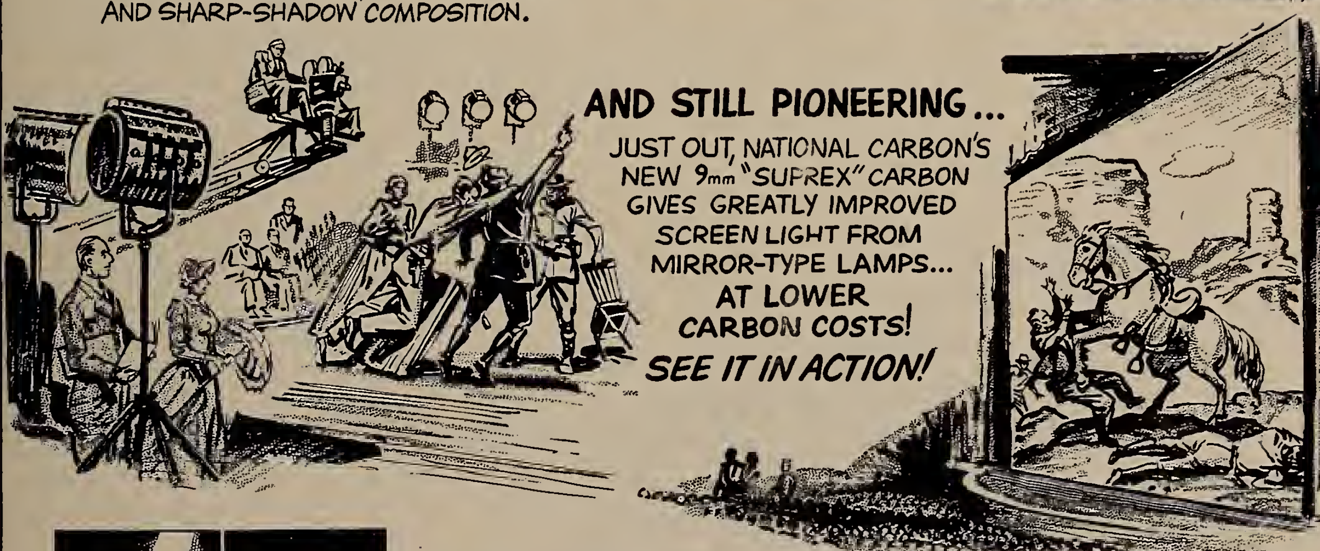
...THE "NATIONAL" CARBON ARC... HEIGHTENED THE DRAMATIC EFFECT AND VERSATILITY OF SUCH GRIFFITH "FIRSTS" AS CLOSE-UPS, BACK-LIGHTING, AND SHARP-SHADOW COMPOSITION.



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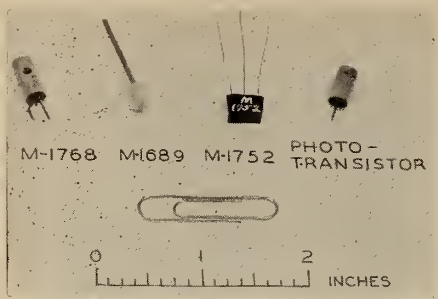


FIG. 3. Three types of transistors and a phototransistor, photographed with a common paper clip.

sively in the projection room as rectifiers.

Selenium also is a semi-conductor used as a rectifier in the projection room and elsewhere. In addition to being a rectifier, selenium is light-sensitive; its conductivity varies with its illumination; and the first photocells were selenium photoconductive cells.

Thus the semi-conductors constitute a large and varied family of materials, richly attractive to the curiosity of scientific investigators. Why is a semi-conductor? But for that matter, why is any conductor, and what is an insulator?

Electrical Conductivity

The atoms of solid substances, such as metals, are held together in crystalline lattice or other form by their respective electrons. In some cases, not all the atomic electrons are needed for this purpose; a surplus exists; and this surplus is mobile. All of the best metallic conductors, copper, silver and so on, have one atomic electron each in their outer atomic rings. Apparently the electrons of the inner rings sustain the metallic structure and the single outer-ring electron is free to move through the lattice in response to any electro-motive force that may be applied.

In an insulator there are no surplus electrons, all are needed to bind the atoms together; application of an electromotive force great enough to impose mobility on the bound electrons disrupts the material. In semi-conductors the lattice structure of the atoms may be incomplete in the sense that not all the electrons that should be there are present; "holes" may exist, but not enough of them to cause the structure to fall apart. In other parts of the same semiconductor there may be a surplus of electrons. An electron may also leave its position in the lattice, drift through the material and pop into an existing "hole" which is then filled while a "hole" remains where the electron used to be. In this sense it can be said that holes move through the material like bubbles through liquid.

It seemed reasonable to the investigators to suppose that the electrons of a semi-conductor could be made to move by application of an electromotive force; for example, a magnetic field. Or, by voltage applied through direct contact. Many experiments were made along these lines. Complications came up; the electrons did not always behave the way calculations said they ought to. But ultimately the experimenters found themselves with a germanium-metal cat-whisker contrivance that they called the transistor and that could amplify and oscillate like a vacuum tube.

Germanium Transistor

Carbon, a semi-conductor, is not a metal. Tin, an excellent conductor, is a metal. In the periodic series of chemical elements germanium is located between carbon and tin.

The first transistor differed in con-

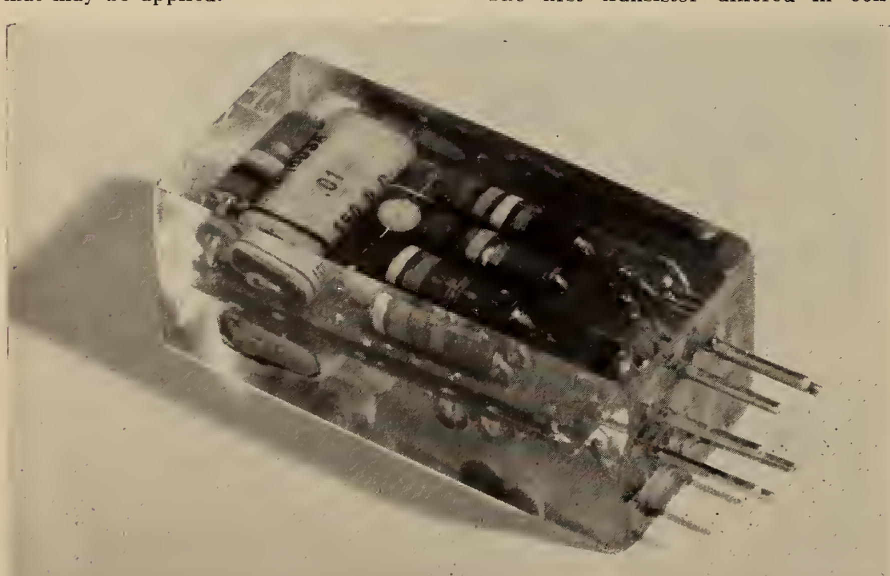


FIG. 4. This is an experimental telephone amplifier. It has transistors instead of tubes, therefore develops substantially no heat in operation. The entire amplifier is embedded in transparent plastic, and in event of trouble is unplugged and replaced as an expendable item.

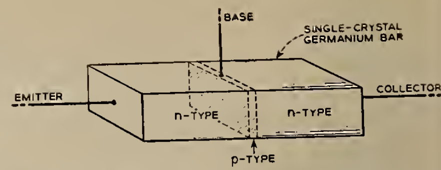


FIG. 5.—Transistor construction: a bar of germanium metal, with three connections. The two ends have been so treated that they contain an excess of electrons beyond the quantity needed to maintain the crystal structure of the metal, and are therefore "n" or negative; the thin center section has been treated to produce a deficiency of electrons there and consequently is "p" or positive. This is an *n-p-n* junction transistor. There are also *p-n-p* junction transistors, cats-whisker transistors, and phototransistors.

struction from that of Figure 5. In that model the junctions between emitter and base, and between base and collector,

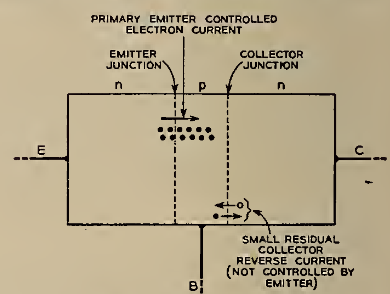


FIG. 6. Functioning of transistor. Electron current flows from left or "emitter" *n* section through "base" *p* section to "collector" *n* section. Extent of electron flow across base or *p* section is governed by input to *p* section, much as plate current in an amplifier tube is controlled by input to tube grid. A very much smaller reverse current (as in a copper oxide rectifier) also exists and is shown at the bottom of the drawing.

are broad areas. In the earlier models they were pin-point connections similar to those of the cat-whisker crystal detector of early radio days. Surface effects and contact difficulties complicated the performance of those first transistors, obscured the true action from the investigators, and made it almost impossible to built two that acted alike.

The germanium junction transistor, Figure 5, is stable in performance, and is being produced in quantities within limits of variation no greater than those encountered in manufacturing vacuum tubes.

The action of Figure 5 is diagrammed in Figure 6. It has been compared to that of a vacuum tube, supposing the left section to constitute an emitter and the center section a grid. The right section then corresponds more or less to the plate of a triode. This comparison is carried out in the circuitry of Figure 7 and diagrammed comparatively against the schematic of a vacuum tube in Figure 8.

A signal to be amplified, applied to the

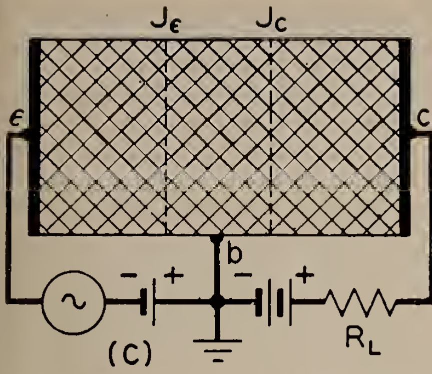


FIG. 7. NPN transistor circuit. Negative potential and signal to be amplified are connected to left or "emitter" section; positive voltage and load to right or collector section. Both circuits, and base section, are grounded.

emitter and base sections of the junction transistor, upsets the electron-hole balance of the material and therefore its conductivity. The stronger current flowing between the collector section and the base is modulated accordingly, and an amplified duplication of the signal thus appears across the load.

In the phototransistor, Figure 2, light falls directly on the germanium metal which responds, selenium-like, by altering its conductivity. The phototransistor is, therefore, a photoconductive cell. It is built as a simple series circuit, not in the triplex arrangement of the amplifying transistor.

Advantages of the Transistor

The prime advantage of the transistor, as compared with the vacuum tube, lies in the fact that the first operates by means of electrons in a solid and the second via electrons in a vacuum. The comparative weakness of the vacuum tube is the method needed to get the electrons into the vacuum. They are gotten there by applying intense heat to a cathode. When the cathode is made hot enough, they boil out. But a tube handling a microwatt signal may need a watt of cathode power. The inefficiency is 1,000,000 to 1.

In the transistor, to the contrary, there is no need to pay the cost of removing electrons from their accustomed abiding place in order to put them to work. They work right where they are, and the only motion imposed on them is that imposed by the input and output signals themselves—*i.e.*, useful motion.

The waste power (sometimes a millionfold waste as just seen) which is involved in putting electrons to work inside a vacuum tube, manifests itself as heat. This heat does much harm to related equipment items unless adequately ventilated. The need for ventilation means that electronic equipment cannot usually be sealed against lubricating oil. (Need for changing tubes also makes hermetic sealing somewhat impractical in common apparatus.)

Further, the tube, not being a solid block of germanium, but an assemblage of elements, is subject to displacement of those elements relatively to each other as a result of mechanical vibration, and hence can become noisy.

The cathode-heating equipment and circuits may also be bulky. In many common amplifiers the heaviest, largest, and perhaps also most expensive, single component may be the filament transformer. Transistors have no filaments.

In the vacuum tube, certain minimum spacings between elements must be provided, according to the voltages applied, to prevent flashover. These spacings limit the possible "miniaturization" of the tube. No corresponding requirements apply to the transistor, which can be made extremely small. Primary considerations governing its size are simply (as in the case of an ordinary wire) the resistivity of the material and the current it is required to carry.

Drawbacks to the transistor, no doubt, will be discovered when it comes into more general use. According to all experience, "bugs" will be found in the field that did not reveal themselves in the laboratory. At the moment, however, the transistor sounds almost too good to be true.

Western Electric Company and RCA, among others, are currently very actively engaged in adapting transistors to working electronic apparatus and vice versa. The telephone amplifier shown in Figure 4 is an experimental model; but IP will print next month a photo of an actual transistor amplifier in commercial use in telephone circuits carrying heavy public traffic.

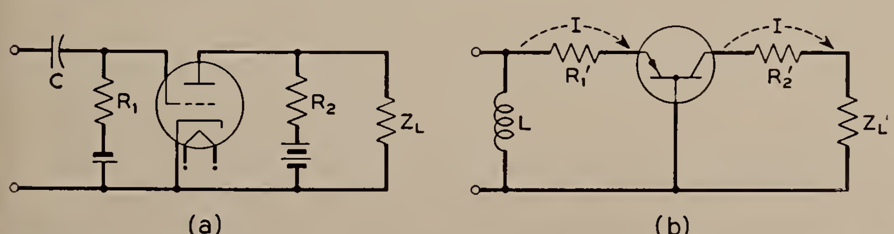


FIG. 8. Conventional amplifier and PNP transistor amplifier schematics compared. Input and output current sources are indicated by the arrowheaded arcs designated, *I*, *I*. Polarities are not the same as in Figure 7 which shows an NPN type transistor.

PERSONAL NOTES

EDWIN L. GRAUEL and A. DEXTER JOHNSON have been named assistant directors of advertising by Eastman Kodak Company. GRAUEL is a graduate of University of Pennsylvania and joined Eastman Kodak in 1930. He is a member of the American Marketing Association, American Statistical Association, Audit Bureau of Circulation, and other important bodies in the advertising field.

JOHNSON, graduate of Brown University, has been with Kodak since 1934, and in charge of the company's impressive colorama exhibit in Grand Central Station, New York, from its inception. He is a director of the Advertising Council of Rochester. W. B. POTTER, director, and L. H. BARTLETT, associate director of advertising, announced the appointments.

JULIUS HABER, whose association witb RCA dates from 1922, has been appointed director of public relations for RCA Victor Division. He succeeds JAMES M. TONEY, who has been named director of the consumer products division. HABER started with RCA as an office boy. His most recent post was that of director of advertising and sales promotion activities for RCA Victor Division. C. M. ODORIZZI, operating vice president of the division, announced tbe changes.

ROBERT C. MCCLELLAND and PHILIP M. CHAMBERLAIN have been named to new posts by THOMAS H. MILLER, manager of Eastman Kodak's photographic training department. MCCLELLAND will be assistant to Miller and will supervise photographic and visual aid services; CHAMBERLAIN is appointed supervisor of group instruction. Both men have been with Eastman Kodak since 1946.

KNUTE PETERSEN, formerly general production manager for Bell & Howell has now become vice president in charge of manufacturing for Radiant Corporation, manufacturers of projection screens and accessories. Petersen has done post graduate work at University of Chicago and Northwestern U.

D. A. ("DAVE") PETERSON, formerly of U. S. Navy, has been appointed Western Division Manager of Altec Service Corporation, succeeding the late Stanley M. Pariseau. Executive vice president H. M. BESSEY announced the appointment.

The Chairman of the Board of Eastman Kodak Company, T. J. HARGRAVE, is currently observing his 25th anniversary with the company.

Free Films in Louisiana

Louisiana Film Catalog Project bas compiled a list of films that are available on free loan in that state. The work was done by Louisiana State Library, financed by a grant of $5,000 from the Carnegie Corporation. A total of 855 different titles is included in the catalog. The catalog is being distributed on request to the Library at Baton Rouge.

IN THE SPOTLIGHT

THE AFL's "Reference Guide for Trade Unions" in the matter of pension plans has now reached this desk. The existence of this guide, which bears the official title "Pension Plans Under Collective Bargaining," was noted herein in October. It is a 114-page, paper-bound pamphlet, sold at 25 cents by the AFL headquarters in Washington. The entire subject of labor union pension plans, what they are, why they exist, how they relate to Social Security, laws concerning them, cost factors, methods of financing, methods of administering, benefit provisions and costs, basic factors in pension negotiations, all are covered in considerable and apparently very expert detail.

A number of typical existing pension plans of AFL unions are listed in an appendix for the guidance of union officials and members; one of these is that of New York Local 306, IATSE.

"A retirement plan," the preface notes, "should be tailor-made to conform to the needs, characteristics, and resources of the particular group of workers which it is to cover. Its structure, its cost, and its value to the members will depend upon factors which vary from one group to the next. It is therefore a mistake simply to take another union's plan and adopt it, in all its details and without modification, as model for an entirely different group of workers."

"The Federal Social Security System," the preface notes in another place, "even after recent improvements, still remains pitifully inadequate. A private pension plan will therefore seem to many to provide a sound and logical solution to the financial problems of the aged. Older members will naturally favor the idea. Younger members who can see far enough ahead to consider the time when they will be in the same boat will also be inclined to approve."

"The union negotiator," explains the first chapter, "should have a clear idea of the fundamental nature of a pension plan—what it can and cannot do, and how it fits in with all the other interests and aims of the union. He should know what the primary objectives of the plan ought to be, how those objectives rank in the order of priority, and how they can best be carried out. He should know what provisions are needed in order to provide the greatest possible degree of protection to the rights of the membership as a whole. This he cannot leave to the outside 'expert'.

"Pensions are a labor cost item, like all of the other economic terms of the working agreement. Viewed solely from this standpoint, it should make little real difference to the employer whether that cost is incurred in the form of contributions to a pension fund, or in the form of higher wages, paid vacations, a health insurance plan, or a reduction in standard working hours.

"A union's ability to negotiate a pension plan will depend largely upon its ability to bring enough argument and pressure to bear to induce the employer to accept a higher labor price. Under ordinary circumstances then, a union that is able to persuade an employer to pay into a pension fund should be just as able to take that economic gain in some form other than pensions if it elected to do so.

"The negotiation of a pension plan therefore involves the sacrifice or deferment of some other alternative objective to which the union could have devoted its collective bargaining energies. In its simplest terms, this presents the union with the question of a choice between current wages and deferred wages — of whether or not it would be wiser to take the cash and let pension credits go.

"Of course, there are other factors which may at one time or another make it easier or more desirable to negotiate a retirement plan than to secure an equivalent increase in cash wages or other benefits. Among these factors may be certain tax advantages for the employer, and precedents in other parts of the trade or in other trades—not to mention the wage stabilization situation.

"Since their effects from the standpoint of inflation are entirely different, as well as for practical administrative reasons, the Wage Stabilization Board has quite properly placed wages and pension plans under separate sets of rules. The Board may accordingly permit the establishment of a pension plan where it would not approve a straight wage increase.

"Under normal conditions, however, most unions must eventually decide whether the interests of the members would be better served by going after a pension plan or by concentrating on the task of improving the wage scale. This is a decision which each union must make for itself, in the light of its own particular circumstances."

Legal regulations and the tax position of pension plans are among other factors the booklet examines in considerably detailed analysis. In the matter of legal restrictions, for example, it points out that:

"The Taft-Hartley Act places certain restrictions upon employer payments to union pension and welfare funds. Section 302 of the Act requires that:

"(1) A written agreement must be made with the employer detailing the basis upon which payments are to be made.

"(2) Employer contributions to union pension and welfare funds must be made to a trust fund, with provision for equal representation by management and labor in the administration of the fund, together with a neutral party or umpire to settle disputes. If the neutral party cannot be agreed upon, he is to be named by the United States district court.

"(3) The agreement must provide for an annual audit, and public posting of the results.

"(4) Pension funds must be kept in a separate trust and used only for pensions or annuities."

We commend this AFL booklet to all Local Unions and their members. If readers so desire, we shall be willing to reprint it serially in these pages.

What is your pleasure in the matter?

• The facilities of the University of Kentucky were made available to the Kentucky Federation of Labor's Department of Research and Education Labor School for its 1953 sessions. This agreement is the culmination of six years negotiations between the University and the Kentucky Federation.

• The dual union situation which plagued IA Baltimore Local 181 for many years is now a thing of the past, and the Motion Picture Projectionists Union of Baltimore City, Inc., which was declared

Thank You, Mr. Kurth!

To the Editor of IP:

Enclosed please find my check for $4.00 for a two-year subscription to your magazine, "*International Projectionist.*" I have found it very interesting and informative.

I am at the present time working part time in Buffalo theatres and am Director of Audio-Visual Education at Le Roy, N. Y.

Alvin F. Kurth
Le Roy Central Schools
Le Roy, N. Y.

The American Labor Movement

Prepared by the Department of Labor for official use and reference, this history traces labor activity and legislation from Colonial times to today.

Chapter III (Continued). Between Two World Wars

THE National Labor Relations Act (Wagner Act), passed July 5, 1935, guaranteed the right of workers to organize and bargain collectively with their employers. It also prohibited employer-dominated or -financed, company unions.

After the Supreme Court upheld this act in April 1937, organized labor made even greater advances than under the NIRA. By the end of 1937, the teamsters' union reported a membership of 210,000, or three times its 1933 membership; the International Association of Machinists had 138,000 members; the International Brotherhood of Electrical Workers nearly doubled its membership, rising to 171,000; and the Hotel and Restaurant Employees' Union expanded from about 25,000 members in 1933 to 107,000 in 1937.

The Fair Labor Standards Act was a major example of national labor legislation designed to help the worker in the solution of his economic problems. This law, in effect since 1938, sets minimum wage, overtime, and child labor standards which apply to employees engaged in interstate commerce or in the production of goods for interstate commerce. The act received particular support from unions in the textile and apparel industries, both of which contained large low-wage segments, generally in the Southern States, and from the mass-production industries. The 40-cent minimum hourly wage provided by the original act was raised to 75 cents in January 1950.

Progress in membership was accomplished in spite of—or perhaps because of—an internal struggle which developed in the American Federation of Labor, primarily over the industrial versus craft unionism issue. The San Francisco (1934) convention of the AF of L adopted by unanimous vote a report of its resolutions committee which declared that in the mass-production industries new methods had been developed for organizing workers whom it had been "most difficult or impossible to organize into craft unions." The report continued:

> To meet this new condition the Executive Council is directed to issue charters to national and international unions in the automotive, cement, aluminum and such other mass-production and miscellaneous industries as in the judgment of the Executive Council may be necessary to meet the situation.

The resolution also indicated that the jurisdictional rights of existing trade-unions would be recognized. Organizations along craft lines would be retained in those industries where the lines of demarcation between crafts were distinguishable.

Division in the Labor Movement

During the following year the AF of L granted charters to organizations of workers in the automobile and rubber industries. In defining the jurisdiction of these unions the AF of L executive council specifically excluded, however, certain skilled craftsmen and maintenance employees coming under the jurisdiction of other unions.

The industrial or craft organization issue was again brought before the AF of L at its Atlantic City (1935) convention. A minority report of the resolutions committee protested the executive council's interpretation of the San Francisco declaration in industrial unionism and called for "unrestricted charters" to organizations set up in mass-production industries. Defeat of the minority report by a vote of 18,024 to 10,093, after lengthy debate, left the issue unresolved and led to the schism in the labor movement which followed.

Formation of CIO

A few weeks after the 1935 convention, six AF of L affiliated unions and the officers of two other AF of L unions formed a "Committee for Industrial Organization," with the stated purpose to promote organization of the workers in mass-production and unorganized industries and to encourage their affiliation

(*Continued on page* 32)

IN THE SPOTLIGHT

(*Continued from preceding page*)

by the National Labor Relations Board to be a company union controlled by the Motion Picture Theatre Owners of Maryland, has been dissolved. This rump union numbered about 100 members, 30 of whom were obligated into Local 181 at the September meeting. It is expected that the rest of the men will follow suit very shortly.

IA Representative Maynard K. Baird, charter member and former business representative of Local 405, Knoxville, Tenn., was assigned the task of signing up these men for membership in Local 181. His patience and tact in handling this difficult assignment were rewarded when the 30 former dual-union men joined the ranks of the IA Local.

• At the recent Nebraska State Association meeting Alvin Kostlan (Omaha Local 343) was re-elected to the office of president, and Roy Wermer (Lincoln Local 151) was re-elected first vice-president. Kostlan is very active in labor circles in his part of the country and in addition to his official duties as president of Local 343 and of the State Association, he is also an executive board member of the Nebraska Federation of Labor.

• *Recent out-of-town visitors to the offices of IP*: Pat Travers and Larry Lewis, Local 173, Toronto, Ont., Canada; Larry Sabatino, Local 650, Westchester County, N. Y.

• A jurisdictional dispute between Local 306 and the Independent Motion Picture Operators Union, New York City, has resulted in an unfair labor practice action before the N. Y. State Labor Relations Board. The dispute centers around a shuttered neighborhood theatre formerly manned by 306 men, which reopened under new management with members of the Indie outfit in charge of the projection room. Contending that it had prior jurisdiction over the house, Local 306 picketed the theatre until the management discharged the Independent members and hired 306 men.

• Local 558, Dayona Beach, Fla., will hold its 27th anniversary party on the 24th of this month.

• The Southern Labor School held its inauguration last month at Lakeland, Fla. Many prominent Southern labor leaders were present at the sessions and the inauguration was termed as "one of the most constructive and forward-looking developments in the Southern Labor picture."

• IA Local Unions throughout the country have been requested by President Richard F. Walsh to write or wire to U. S. Attorney General James P. McGranery in protest against the Department of Justice's action in the 16-mm anti-trust suit.

• A banquet on Saturday, December 6, will mark the 40th anniversary celebration for Local 488, Harrisburg, Penna. Big doings are planned for that occasion with top IA officials and many prominent civic leaders in attendance.

LETTERS TO THE EDITOR

To the Editor of IP:

Having worked in the craft as a motion picture projectionist for over a decade, I am still very optimistic about the future of our medium, the motion picture theatre, but not always certain that the maximum effort is being exerted by the motion picture projectionist in this era of television, the greatest challenge to the movie industry.

Being a projectionist myself, I want to protest against the many faults passed on to me in so many of the films I receive, and the embarrassment I often feel when I attend a movie. I enter a motion picture theatre as a patron with a little more knowledge of projection than the next person. Is there any excuse for chromatic aberration and loss of light? With most of the marvelous projection equipment now in use, is there any reason whatsoever for blank screens, too high or low voltage, hot spots on the screen, poor changeovers, or out-of-focus pictures?

How can a man miss those splendid 4-frame motor or changeover cue marks? The only reason for punched holes, crayon marks, scratches that resemble billiard balls breaking up, *etc.*, is, in my opinion, due to the laxity of some projectionist down the line who doesn't want to take time out to look for the approaching cues. Regardless of the throw from the lens to the screen, the standard cue marks placed on the frames are sufficient signal to warn the projectionist of the approach.

The man who mutilates the cue marks is making the customer conscious of the fact that an interruption in the picture is forthcoming; such mutilations are observed by the audience, and all the fascination of the images being projected is lost. Try sitting in with the audience some time when you are free, and you will note the distraction caused by "a lit-up Christmas tree."

Cue Mark Mutilation

I am not fortunate enough to work in a first-run house where I can enjoy an "untouched" print. What happens after the print leaves first-run houses and goes down the line? How enjoyable it is to watch a Technicolor print with its "seal cues"; yet in some cases when I get this same print some nice fellow has scratched X'x on the same 4 frames with a sharp blade and put crayon marks on the next 5 frames. This type of dressed up cue mark kicks the fascination of projection technique right out the front door. To me, all science is gone. The art of changing-over is not there and cannot be there so long as the audience sees these mutilations on the screen.

It always gives me a thrill to receive an untouched print. I look back and admire the men who have shown it and take great pleasure in trying to reproduce the past performances of this print. What do you say, boys, give me a break; lay off the cue marks, please! I want the satisfaction of a first-run also. If there are prints that bear poor cue marks —sometimes the exchanges fail to bring out clear ones—the projectionist can make his own with a cue marker, or if this mechanical device is not available, crayon or any other marker that will not be noticeable will serve.

Working without a cue marker my co-worker and I sometimes memorize the forthcoming events and make excellent change-overs without the change-over cue mark. When we ship the print out again, we enclose a note to the next user, placing a strip of paper on the reel that is without cue marks.

Torn Sprocket Holes

And why must sprocket holes be torn by poor threading? I claim to have what might be the first Simplex sound projector; every bit of equipment in my projection room is outmoded. Others in the craft are more fortunate than I in being equipped with the latest apparatus. And yet, on those silent-running jobs, how much film is torn by not being properly engaged! I have tried to run a feature in which one reel had the entire sprocket row stripped and sheered because some previous projectionist did not make sure his film was properly engaged.

A basic rule in my projection room is to handle the prints with care. Clean hands, clean machines, no altering of prints, and proper splicing. Who is the man who makes a 100 percent out-of-frame splice? If he goes to the trouble to repair the film at all, why doesn't he make an in-frame splice? We can't expect the next projectionist to carefully examine *every* frame of film.

Many leaders come in spliced out of frame—we try as much as possible to correct this. Certainly if any misframe splices occur after No. 8 on the leader; surely the next projectionist would like to frame up on No. 8 (or any number he uses on his machines), knowing his leader is framed all the way to the picture itself.

I sometimes come upon a theatre beautiful with a most appealing entrance, showing supreme showmanship. But showmanship does not end at the ticket office. We projectionists have to deliver what the marquee promises. Come on, boys, it's Movietime USA. Let's help the industry — which means helping ourselves. To me, motion pictures are and will always be the greatest entertainment medium. To me, smart showmanship begins in the projection room.

When I project a picture, believe me, I am shooting the works. I am selling that picture to the utmost—clear sharp

(*Continued on page* 26)

Laws of Optics Explain Flying Saucers, Scientist Says

DR. I. M. LEVITT, Director of the Fels Planetarium at Franklin Institute, Philadelphia, believes the flying saucers to be "mirages pure and simple" and explains their appearance by the laws of optics. Dr. Fels' views, presented in full in *Popular Mechanics* for September, 1952, are here summarized by permission of that publication.

"Once upon a time," Dr. Fels remarks, "the only place where flying saucers were seen was in the Far West. . . . The lone prospector looked up, saw the momentary appearance of strange lights, and went about his work.

"Today there are hundreds of thousands of persons in the desert regions working for the Atomic Energy Commission and the armed services. Today, the tremendous population in that part of the country has brought to the attention of scientists the fact that there are strange illuminated features in the sky. Make no mistake about it. Something is seen—but that something is not a flying saucer from another world nor is it an airplane from any other country on earth.

The Optics of It

"The features are mirages pure and simple. They are generally associated with hot, dry countries and are most commonly seen over desert regions. As one goes higher and higher in the atmosphere the air gets cooler and cooler, but occasionally there is found a warm layer riding on top of a cold layer of air. . . . As a result, there is found a temperature inversion and the light normally going up and being lost in the sky is bent. Thus light sources from distant cities will be seen against a black

(*Continued on page* 25)

16-mm

BECAUSE EXPANSION OF 16-mm ACTIVITY PROVIDES INCREASING FIELDS OF EMPLOYMENT FOR SKILLED PROFESSIONAL PROJECTIONISTS IN TV STUDIO AND NON-THEATRICAL SHOWINGS, AS WELL AS ENHANCED POSSIBILITIES OF PERSONAL BUSINESS VENTURES, THIS 16-mm DEPARTMENT OF IP WILL APPEAR MONTHLY.

DeVry's JAN Magneto-Optical Portable Projector

JAN (Joint Army-Navy) specifications governed the design and performance characteristics of the 16-mm sound projector here pictured, a product of DeVry Corporation. Some 8,000 copies of it are currently in use by the armed forces for instruction and entertainment. The projector is of post-World War II design; magnetic sound facilities were added in 1952.

The equipment consists of three portable units, projector, amplifier and loudspeaker. A portable screen, if used, would constitute a fourth unit. Interconnection is effected by plug-in cables.

Specifications governing the design, construction, performance and durability of this equipment fill a 60-page booklet printed in small type. JAN specs go into detail, relating not only what the equipment must be able to do, but also the exact methods of testing to determine whether it does it. A few excerpts from those specs are submitted here, mostly in the government's original language.

The projector pictured meets these requirements:

Projection Performance

The light output of the projector at rated voltage with shutter running shall be not less than 275 lumens when using new 750-watt lamps . . . or not less than 385 lumens when using new 1,000-watt lamps. . . .

The average illumination at the four corner points shall be not less than 65 percent of the illumination at the center.

Vertical unsteadiness having a period shorter than 1 second shall not exceed 0.2 percent of the picture width in new projectors . . . and shall not exceed 0.3 percent of the picture width in projectors which have been operated for a period of 500 hours. Horizontal unsteadiness having any period whatsoever shall not exceed 0.2 percent of the picture width, either in new projectors or in projectors that have been operated for a period of 500 hours.

No differences in the sharpness of focus of the four corners of the projected image of film passing through the gate of the projector shall be visible from a distance of twice the width of the screen.

Sound Performance

The amplifier shall deliver an output of at least 12 watts with a total harmonic content not exceeding 2.0 percent at any frequencies from 100 to 2,000 cycles, or 4.0 percent at any frequencies from 2,000 to 4,000 cycles.

The over-all noise level of the equipment under normal operation and running without film, as measured electrically at the speaker terminals, shall be not greater than —22 vu (volume units, a unit related to the decibel—Ed. note).

The projector and its associated amplifier shall have a response-frequency characteristic between the dotted limits shown on Figure 3 (flat within 4 db 100-5,000 cycles—Ed. note).

The total rms flutter . . . shall not be greater than 0.35 percent. . . .

Durability

The equipment, packed for carrying, shall be dropped 10 times on a concrete floor from a height of 18 inches (and) except for installed tubes and lamps, shall not be damaged.

The equipment, assembled and ready for operation, shall be rigidly mounted on a vibrating platform . . . this (vibratory) motion shall be applied for a period of two hours. No screws, nuts, bolts, electrical connections, or other parts shall become loose, break or go out of adjustment as the result of such vibration, lamps and electron tubes . . . excluded.

Continuous operation of the projector at rated voltage for 2 hours with the 1,000-watt projection lamp in use shall not produce a temperature rise of any external part of the projector, exclusive of the top cover of the lamphouse, in excess of 50° F. above the ambient.

Continuous operation of the projector at rated voltage for a period of 10 hours with the 1,000-watt projection lamp in use and the ambient temperature at any desired value up to 122° F. shall cause no bulging of the lamp envelope or other damage to the lamp or to the projector due to excessive heating.

Serviceability

The design of the equipment shall be such that, in the replacement of interchangeable parts, no adjustments are required that cannot be performed by a servicemen using standard screwdrivers, wrenches, test films and electrical test instruments customarily available. No tools except common coins shall be required to replace electron tubes, including phototubes; exciter, projection.

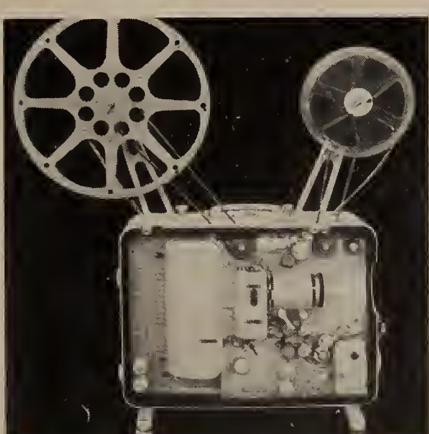


FIG. 1. The projector set up and ready for operation, with film threaded. Cable connections to the other units of the system are not shown in this picture.

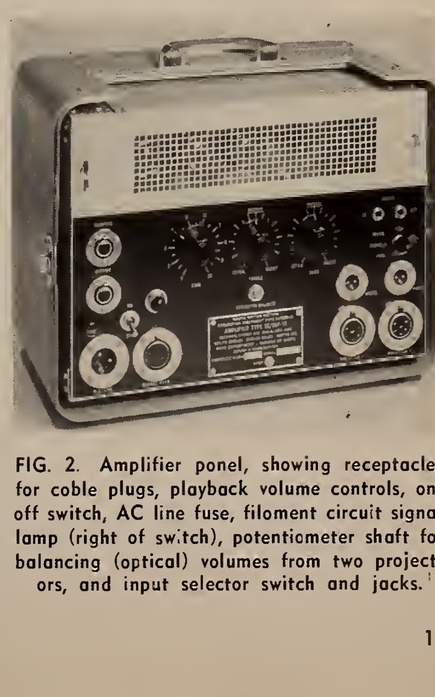


FIG. 2. Amplifier panel, showing receptacles for cable plugs, playback volume controls, on-off switch, AC line fuse, filament circuit signal lamp (right of switch), potentiometer shaft for balancing (optical) volumes from two projectors, and input selector switch and jacks.

FIG. 3. Operating side of magneto-optical 16-mm projector and magnetic track recorder, with callouts indicating locations of magnetic erase head and magnetic soundhead. Bezel-lamp compartment at lower right contains optical reproducing elements; soundhead roller, just left of this, mounts recording and playback magnetic head.

threading and indicator lamps; and fuses. All belts shall be replaceable without the aid of tools.

Each . . . major subassembly . . . except the projection objective lenses and the sound optical-system lenses, shall provide easy and ready access to its interior parts, terminals and wiring for complete circuit checking and for the removal and replacement of component parts.

The projector shall be so designed that the incandescent lamphouse may be removed and replaced by an arc lamphouse without any necessity for mechanical modification of the projector.

Film Damage

Newly processed and lubricated sound and picture film, in good condition, and having a shrinkage not greater than 0.3 percent, shall exhibit, after 1,000 passages through the projector mechanism with the 750-watt projection lamp burning, no visible evidence of damage in the projected picture and no audible evidence of damage to the soundtrack. . . . The average life of 10 well-made splices . . . shall be not less than 400 passages through the projector mechanism with the 750-watt lamp burning.

With standard reels of from 400- to 2,000-foot capacity, the take-up shall subject the film to a tension of not more than 5 ounces or less than 2 ounces.

Means shall be provided whereby the sprocket will feed film having three adjacent damaged or broken perforations without causing further damage to the film.

The intermittent mechanism shall feed film having two adjacent damaged or broken perforations without causing further damage to the film.

At no point in the path of normal film through the projector, during normal operation, shall the picture area or the sound-track area contact a stationary metal part. All idler rollers and sprockets shall be undercut so as to avoid any contact with picture or sound-track area.

Descriptive Details

Control panel of the amplifier is shown in Figure 2. Circuits follow accepted audio practice with a pentode input stage, three triode stages, a phase-inverter and push-pull pentode output. Inverse feedback is taken from recorder head secondary of the output transformer; this unit has two secondary windings, one for the loudspeaker and one for the magnetic recording head.

Power supply circuits of the amplifier include a pentode, connected as oscillator, to provide 112,000 cycles for the exciter lamp or erase head, as needed. As applied to the lamp filament, this frequency produces no hum that can be heard in the sound; applied to the erase head it is too high to be recorded on the magnetic track but produces a demagnetized or "erased" state in the track, which is then ready to receive new sound.

The panel of the amplifier displays, as can be seen in figure 2, cable connector receptacles for the AC line; for an external changeover device (if used); for two projectors (if more than one is used); microphone and record player (if used) and loudspeaker and recording monitor; and jack connectors for the magnetic head and separate amplifier (if used).

There is an overall gain control, and separate gain controls for bass and treble frequencies; and a coin- or screwdriver-operated "projector balance" that permits matching the (optical) inputs from two projectors (if used) to eliminate any fluctuation of volume at changeover. The three-position switch at right, center, affords choice between optical, microphone or phono input. The output from this switch is opencircuited when the magnetic head output is plugged into the "bridge in" jack.

Additional voltage amplification is required in order to raise the magnetic signal level to that of the lead sulphide photo-resistive cell. This is provided by a two-stage triode pre-amplifier, equipped with its own rectifier tube and DC power supply.

Figure 3 pictures the operating side of the projector mechanism. The erase head is (as indicated) located physically just ahead of the pulldown sprocket. The magnetic head, which serves both for recording and for playback according to switching, is located at the optical sound drum, but cannot be clearly

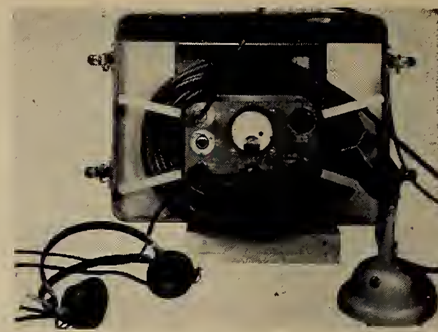


FIG. 4. Magnetic recording accessories, including remotely-located recording monitor panel, mounted in top of speaker cabinet. Both microphone and output lines run through this panel; the volume control in the upper right corner bridges the mike line; other equipment substitutes for the loudspeaker and monitors amplifier output.

seen in the illustration. It is extremely small, measuring only ¼-inch length x ¼-inch diameter, and concentrating its field force upon an area or gap only 0.0003 inch long. This tiny magnet is mounted on a yoke and is subject to any of six field adjustments, all of which can be accomplished by relatively unskilled personnel: for azimuth, height, lateral position, contact pressure, tracking, and tangentially to the sound drum.

Figure 4 shows the remote control recording monitor, as mounted in the top of the speaker carrying case. The microphone line passes through this unit en route from mike to amplifier; the volume control in the upper right corner is a potentiometer bridging the line, by means of which the recorded volume can be adjusted.

The remainder of the equipment in this monitor, including the db meter (which is calibrated to read plus or minus around a position of 0 at the center of the scale) is connected to the amplifier output circuit; *i.e.*, to the speaker winding of the amplifier output transformer.

Since the speaker is not wanted during recording, plugging in the headphones opencircuits it; the headphones and db meter take its place in the circuit. The person controlling the process of magnetic recording then adjusts volume from time to time as desired, guiding himself by the shifting meter indications and by the sound in his headphones. Distraction and faulty judgment resulting from projector noises are minimized by this arrangement, which locates the control instruments and operator at a distance from the projector.

Library Offers a 16-mm Film

A 20-minute black-and-white 16-mm film portraying the services a public library renders to its community has been produced by the Brooklyn Public Library and is offered for sale by the Office of the Editor, Public Library, Grand Army Plaza, Brooklyn, N. Y.

Training Films for Projectionists

PROJECTIONISTS and projection Local Unions interested in studying such subjects as television, the training of apprentices or new members, or in refreshing or extending further the technical backgrounds of older members, may wish to use 16-mm training films now available. The desirability of such films to both experienced and student projectionists is recognized in IA circles. Russell H. Search, secretary of Local 403, Sunbury, Penna., writes to IP as follows:

"It would be a great help to small Locals like ours if a library of 16-mm films on TV, radio and electronics were available through some source such as IP, IA, or RCA. I know some companies have training films which would be of service to IA Locals and think it would be an excellent idea if IP would publish a list of these films and where they can be obtained."

List of Training Films

The list of films that follows, compiled by IP from various catalogues and other sources, is not complete. A complete list might fill most of this issue. It is, however, intended to be representative. Films included touch on the fields of television, optics, lubrication, electronics, sound, mechanics, electricity, and motors and generators.

All are 16-mm sound films in black-and-white unless otherwise noted. A few, as will be seen on the consulting list, are available in color and in 35-mm.

The listing names each film, indicates briefly its scope of coverage, and advises the source from which it can be obtained, the terms, and the running time. Not every mention includes all this information, however, since all of it was not available in every case. Where an omission is found, the reason was lack of complete data in the catalogues consulted. The source, however, is given in every case, and can be consulted directly by readers who wish further information.

Sources are listed in abbreviated form; these abbreviations are translated into full names and addresses in the tabulation of suppliers that follows the film listings.

These films are intended for different training groups, age levels, and educational and technical backgrounds. IP has not reviewed them. Guided by catalogue information, IP has tried to exclude all that are apparently intended for grade school or other very elementary use, and to include (so far as possible) only film texts designed for adult training or at least senior high school and college levels. Some of the texts are elementary; but these are mostly adult armed forces texts created for the instruction of their members, and, therefore, of potential interest and value to student projectionists also.

Terms

Readers should especially note that the terms cited: "free loan"—"rent"—or "sale" may be very flexible. It is entirely possible that a print listed here as available on sale only can be borrowed on free loan from a nearby library or rented at a very nominal charge from a local 16-mm film dealer. Naturally, IP cannot investigate and report the terms on which prints are *locally* available in every part of the United States and Canada. This must remain a matter for individual or Local Union inquiry in each locality. The terms listed here are those specified by the producer or other primary source; and consequently *not* always the only terms on which a given print can be obtained.

TELEVISION

Cathode Ray Tube: Dr. D. W. Coolidge, director of General Electric's research, explains the manufacture and functioning of this basic component of television equipment. General Electric; 6 minutes.

Cathode Ray Tube—How It Works: Construction and functioning of CR tube and all its parts, and how it puts a visible image on its screen. Navy-Castle; sale; 15 minutes.

Magic in the Air: Television camera and receiving tubes, their construction and operation; television studio settings at Radio City, New York; similarity between motion pictures and television. General Motors; 9 minutes.

Radio and Television: Fundamentals of television; wire photo, radio, photoelectric cell, sound. Development of radio. Voca Guidance; 1 reel.

Television Today: All aspects of television—technical, programming and advertising. Columbia Broadcasting System; free loan; 35 minutes.

The "How" of Television: Basic principles of pickup, transmission and reproduction of Tv images in animated presentation. Hammack; 1 reel.

The Magic in Television Tubes: Animated presentation of principles and functioning of Tv tubes. Hammack; 1 reel.

Look for the Inside Story: How a television set works; tuning, controls, antenna, troubles. Westinghouse; free loan; 15 minutes.

OPTICS

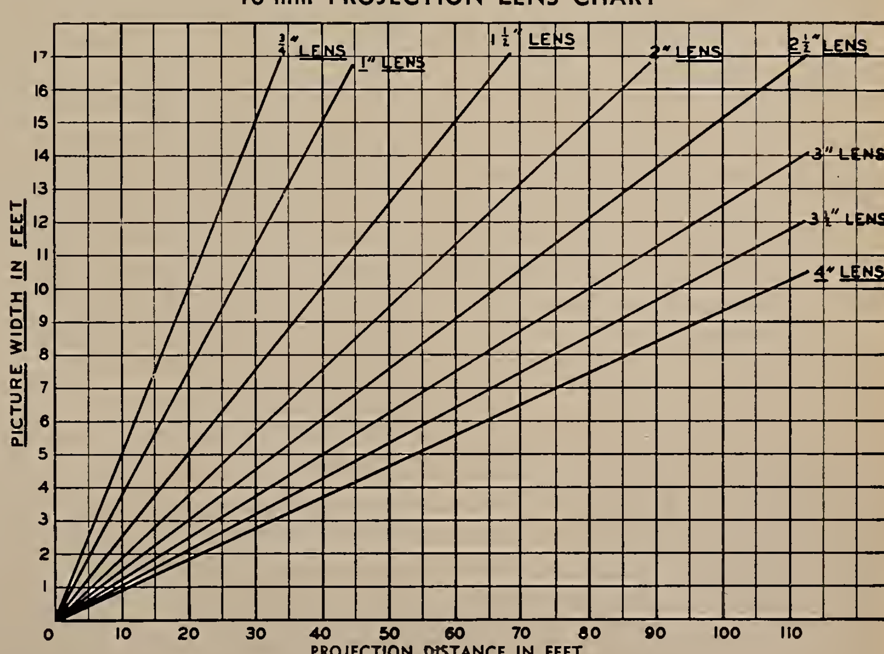
How You See It: Construction of the motion picture projector and optical reasons for lens, shutter and sprockets, in association with phenomenon of persistence of vision. Jam Handy; sale; 10 minutes.

Introduction to Optics: Principles of image formation by lenses; reflection and refraction; light rays and light waves. Navy-Castle; sale; 18 minutes.

Nature of Light: Reflection and refraction. Lenses. American Film, and others, rent; Coronet; sale; 10 minutes. Also available in color.

Light Waves and Their Uses: Reflection and refraction with lenses and mir-

16-mm PROJECTION LENS CHART



rors. Interferometer, polarization, electromagnetic spectrum and quantum theory. Encyc. Brit.; 10 minutes.

How Motion Pictures Move and Talk: Optical, mechanical and electrical principles behind projection. Persistence of vision. Recording and reproduction of sound. Bell and Howell; rent and sale; 11 minutes.

LUBRICATION

Basic Principles of Lubrication: Functions of lubrication in reducing friction and heat. General Motors; 25 minutes.

Lubrication: Theory of friction and lubrication; types of lubricants to use in different applications. Sinclair; free loan via USBM; 30 minutes.

Principles of Lubrication: Need for and action of lubricants. Viscosity and other properties of lubricants. USOE-Castle; sale; 16 minutes.

ELECTRONICS

Electronics at Work: Basic types of electronic tubes and how they function. Sponsored by Westinghouse; modern; 20 minutes.

Electrons on Parade: Construction and functioning, and common and unusual uses for, electron tubes. RCA; loan; 20 minutes.

Excursions in Science: No. 4. The photoelectric cell and sound motion pictures. General Electric; 10 minutes.

Vacuum Tubes: Animated drawings showing how tubes work as rectifiers, amplifiers and oscillators. Encyc. Brit.; sale; 11 minutes.

Principles of Gas-Filled Tubes: Theory of ionization of gases; action of gas-filled diode as rectifier and of gas-filled triode as grid-triggered rectifier. USOE-Castle; sale; 15 minutes.

Basic Electronics: Instruction in fundamentals. U. S. Air Force; free loan; 17 minutes; color.

The Electron—An Introduction: Nature of electrons, electron flow in solid conductors, etc. USOE-Castle; sale; 17 minutes.

Electronics at Work: Theory and common applications of electronics. Westinghouse; free loan; 20 minutes. Also available on 35-mm.

Engineering—Electronics: Four films, 14 to 24 minutes each. Rent or sale; USOE-Castle.

SOUND

Nature of Sound: Vibrations and transmission of sound, clarified with help of oscilloscope. Coronet; sale; 1 reel; black-and-white or color.

Sound Waves and Their Sources: High-speed camera and oscilloscope with sound accompaniment clarify such details as frequency, amplitude, wavelengths, fundamentals, harmonics and transmission of sound. Encyc. Brit.; sale; 10 minutes.

Vibratory Motions and Waves: Slow motion photography illustrates damped, undamped, propagating and standing waves; transverse and longitudinal waves; wavelength, crest, trough, nodes, antinodes, condensation and rarefaction. Edit PS.; sale; rent; 20 minutes.

Sound: Vibrating objects, wires, violin strings, etc. Recorded by RCA-Victor; Edit PS.; sale; rent; 10 minutes.

Sound Recording and Reproduction: Recording of sound on variable area and variable density motion picture soundtracks, and reproduction from such tracks. Encyc. Brit.; sale; 15 minutes.

The Sounds of Music: Sound frequency, amplitude and quality explained with reference to grooves in phono record. Coronet; sale; 1 reel; black-and-white or color.

Fundamentals of Acoustics: Refraction, reverberation, focusing of sound, attenuation in air, reduction of high and low frequencies; animated action accompanied by sound effects. Encyc. Brit.; sale; 10 minutes.

Wire Sizes and Voltage Drop: Measuring wire sizes, figuring circular mil area, voltage drop, Ohm's Law. USOE-Castle; sale; 13 minutes.

MECHANICS

Principles of Gearing—an Introduction: Friction and toothed gears, laws of gearing, pressure angles, velocity rates, involute profiles, cycloid profiles, circular pitch, USOE-Castle; sale; 18 minutes.

Principles of Dry Friction: Definition, static and kinetic friction, calculations, forces involved. USOE-Castle; sale; 17 minutes.

Simple Machines: Basic principles of wedge, pulley, screw, lever, inclined plane, and their applications in machinery. Animated drawings clarify principles. Encyc. Brit.; sale; 11 minutes.

Transfer of Power: Made in England, produced by Shell. Animated diagrams show principles involved in gearing. BIS; sale; rent; 22 minutes.

ELECTRICITY

Basic Electricity: Elementary principles. USAF; free loan; 20 minutes; color.

Capacitance: Elementary principles. Navy-Castle; sale; 31 minutes.

Coils and Electric Currents: Fields of force in electromagnets, solenoids and electric motors. Edit PS; sale and rent; 13 minutes.

Elementary Electricity — Amperes, Volts and Ohms: Navy-Castle; sale; 8 minutes.

Elementary Electricity — Current and Electromotive Force: Navy-Castle; sale; 10 minutes.

Inductance: Navy-Castle; sale; 35 minutes.

Elementary Electricity — Series and Parallel Circuits: Navy-Castle; sale; 8 minutes.

Principles of Electricity: General Electric; 19 minutes; color.

Electrostatics: Conductors and insula-

Public Aware of Quality in Sound, Audio Fair Shows

THAT the public is becoming increasingly conscious of good quality in sound was abundantly demonstrated at the fourth annual Audio Fair held in the Hotel New Yorker, October 29th-November 1st, in association with the convention of the Audio Engineering Society. Attending it were throngs from all over the United States and a few who by their faces must have come from foreign and very distant lands. On display were highest fidelity amplifiers, record players, record changers, loudspeakers, phono pickups, tape recorders, and disc and tape recordings.

High fidelity sound has become an enormous industry.

People make a fad of it, as of photography. They buy ultra-fidelity recordings; two-way speaker systems, driven by two-way amplifiers and baffled in specially constructed cabinets. They put all that gear in their living rooms to play phono records and radio programs; small fortunes are spent on this activity. They are "nuts on good sound" and expertly critical of audio imperfections. (Will anybody who pays $200 for a living-room loudspeaker baffle respect sloppy reproduction in a theatre?)

Binaural sound attracted exceptional attention—even in that gathering of highest quality audio reproduction the binaural demonstration stood out as superlatively natural. Two loudspeakers at opposite ends of a front wall play the same selection but each plays it as heard by a different microphone—most of the volume of the string instruments comes from the left speaker and most of the brass from the right—the effect is a remarkable simulation of the sound of an actual orchestra.

Briefcase tape recorders are an innovation this year. They are miniaturized magnetic tape mechanisms, battery operated, and intended to be concealed, microphone and all, in an ordinary business briefcase.

Among the dozens of manufacturers exhibiting were: Altec Lansing Corporation, Harvey Radio Company, Reeves Soundcraft Corporation, and Revere Camera Company.

tors, positive and negative charges. Encyc. Brit.; sale; 10 minutes.

Elements of Electrical Circuits: Ohm's Law. Encyc. Brit.; sale.

MOTORS AND GENERATORS

Commutation of DC Machines: Theory and practical maintenance. Westinghouse; 24 minutes; also available on 35-mm.

DC Motor Part 1. Mechanical Overhaul: Testing, dismantling, turning commutator, repairing or replacing field coils, reassembling, re-testing. USOE-Castle; sale; 20 minutes.

Repulsion-Induction Motor: General Overhaul: Testing, dismantling, cleaning, replacing bearings, replacing coils, reassembling, lubricating. USOE-Castle; sale; 28 minutes.

Repulsion Motor Principles: Construction and functioning of repulsion motors, effect of brush position; applications of repulsion motors. USOE-Castle; sale; 13 minutes.

Rotating Magnetic Fields: Functioning and construction of polyphase motors. USOE-Castle; sale; 23 minutes.

Single Phase and Polyphase Circuits: Single-, two- and three-phase generators and circuits. USOE-Castle; sale; 17 minutes.

Split-Phase Motor Principles: Stator and rotor construction and wiring, use of capacitor to split single phase. USOE-Castle; sale; 17 minutes.

Squirrel Cage Motor Principles: Fundamental law of induced e.m.f., electron flow in squirrel-cage rotor, resultant torque, construction of such motors. USOE-Castle; sale; 10 minutes.

MISCELLANEOUS

Use and Care of Film Sound Projector: Setting up, threading, operating and maintaining this 16-mm mechanism. Bell & Howell; sale and rent; 20 minutes.

Soldering Lugs and Splicing Stranded Cable: Splicing and soldering light and heavy connections; use of several types of soldering equipment. USOE-Castle; sale; 18 minutes.

SUPPLIERS

The names and addresses of suppliers of 16-mm sound films listed above are appended hereto. It may be worth repeating that these are not necessarily the *only* suppliers for any desired prints or group of prints; that local or nearby 16-mm film libraries may have them and offer them on very varied terms.

Bell & Howell, 711 McCormick Road, Chicago 25, Ill.

British Information Services (BIS), 30 Rockefeller Plaza, New York 20, N. Y.

Castle Films (CASTLE—distributor for USOE), 1445 Park Ave., New York 29, N. Y.

Columbia Broadcasting System, 485 Madison Ave., New York 22, N. Y.

Coronet Films (CORONET), Coronet Bldg., Chicago 1, Ill.

Edited Pictures System (EDIT PS.), 330 West 42 St., New York, N. Y.

Encyclopedia Britannica Films (ENCYC. BRIT.), Wilmette Ave., Wilmette, Ill.

General Electric Co., Visual Instruction Section, 1 River Road, Schenectady, N. Y.

General Motors Corp., 3044 Grand Blvd., Detroit 2, Mich.

Hammack Productions (HAMMACK), 2533 N. Ashland Ave., Chicago, Ill.

Jam Handy Organization (JAM HANDY), 2821 S. Grand Blvd., Detroit 11, Mich.

Modern Talking Picture Service, Inc. (MODERN), 45 Rockefeller Plaza, New York 20, N. Y.

Radio Corporation of America (RCA), Front and Cooper Sts., Camden, N. J.

United States Air Force (USAF), Washington, D. C.

United States Bureau of Mines (USBM), 4800 Forbes St., Pittsburgh, Penna.

United States Office of Education (USOE), Division of Visual Aids, Washington 25, D. C.

Vocational Guidance Films (VOCA GUIDANCE), 2708 Beaver Ave., Des Moines 10, Iowa.

Westinghouse, 306 Fourth Ave., (P. O. Box 1017), Pittsburgh, Penna.

SMPTE Papers of Interest

In accordance with its custom, IP reports to its readers as soon as possible after each semi-annual SMPTE convention the highlights of those technical gatherings from the viewpoint of the practical projectionist. Such report, of the 72nd annual convention, was presented herein in October, page 17, and some of the papers read before the gathering were there reviewed in detail.

A few of the other papers presented before the Convention that will be of interest to projectionists, are abstracted herewith:

NEW PROFESSIONAL TV PROJECTOR

W. E. Stewart

Engineering Products Division, RCA, Camden, N. J.

The RCA Type TP 6A Projector, a new professional projector specifically designed to meet television needs, will be described. The TP 6A features a high-fidelity sound system with fast stabilization time. A 2—3 pulldown system is incorporated especially for television. All gearing runs in oil, and gears and other mechanical parts are designed for long life. Projection lamps change automatically in the event of filament failure. Still pictures can be shown.

DICHROIC MIRRORS AND THEIR LIGHT-DIVIDING CHARACTERISTICS

Mary Ellen Widdop

RCA Victor Division, Camden, N. J.

At present, virtually all lenses are coated to reduce reflection. Plates coated with multilayer films, known as dichroic mirrors, are also being used to efficiently divide light. The recent use of dichroic mirrors in experimental color television equipment is one of the best known applications. This paper reviews briefly the interference phenomenon involved and described the results obtainable with several dichroic mirror designs.

PROJECTOR FOR 16-MM OPTICAL AND MAGNETIC SOUND

John A. Rodgers

Eastman Kodak Co., Rochester, N. Y.

In addition to reproducing sound from conventional optical tracks, this projector is capable of recording and playing back magnetic oxide tracks applied to either single- or double-perforated 16mm films. The important aspects of the mechanical and electrical design are described, showing their relation to the performance of the projector.

SOUND-ON-FILM RECORDING USING ELECTRO-OPTIC CRYSTAL TECHNIQUES

Robert Dressler and Albert Chesnes

Paramount Pictures Corp., New York City

This paper deals with the theoretical and practical aspects of a sound-on-film recorder with no moving parts, utilizing the b-refringence properties of certain crystals. The physical properties of various crystals, as well as final performance measurements of the entire sound system will be discussed.

NOTES ON WEAR OF MAGNETIC HEADS

G. A. Del Valle and L. W. Ferber

RCA Victor Division, Camden, N. J.

Since physical pressure (under contact) is essential between a magnetic head and a magnetic media to provide high-quality sound, it is of extreme importance to determine the operating life of the head. This paper describes the methods used and the results obtained in establishing the wearability of the record-reproduce heads on RCA magnetic projectors.

STANDARDIZATION NEEDS FOR 16-MM MAGNETIC SOUND

E. W. D'Arcy

DeVry Corporation, Chicago, Ill.

Industry requirements for 16mm magnetic sound standards, with a demonstration of the current situation with respect to universal reproducibility of magnetic sound, and an outline of the test film needs for equipment manufacture and maintenance.

FILM PROJECTION USING IMAGE ORTHICON CAMERAS

R. D. Chipp

DuMont Television Network, New York City

Theoretical considerations of the use of image orthicons for film projection have been discussed in the literature. The results of ten months' use of image orthicon cameras for all film transmitted by Television Station WABD, New York, totaling approximately 1700-hr, will be presented. In addition to brief consideration of the technical problems encountered, we will discuss cost, reliability, convenience, and other operational factors.

IA-IP Amateur Radio Bulletins

Contest Prizes Ready

By AMOS KANAGA, W6BAA

Secretary, Local 409, San Mateo, Calif.

THIS IS OFFICIAL—the 1952 IA-IP contest will be extended to January 15 1953. Remember fellows, only IA QSO's in 1952 count in this. The all-time high award for the Brother who has made the most postwar IA-IP contacts will be awarded at the same time. Don't count yourself out gang. A lot of you have come through with the "Worked 10 IA-IP" and the Gold Award "Worked 25 IA-IP"; this definately puts you in the running, so no matter how many IA QSO's you have, send them in, for there are three classifications and all have a fair chance, especially those who have just gotten started this year. Be sure that they are postmarked not later than January 15 1953 and QSO's until that date are OK.

More prizes, you bet. Unfortunately the cuts will not arrive at IP in time to let you see them and drool a bit but Editor A. Nadell (W2URB) promises they will be in the December issue if possible.

Gonset Company sent along some nice ones too, one of their new noise silencers, a new 100% per center indicator, and even a big roll of their special ham ladder line 300 ohm.

San Francisco Radio Supply (near me) through our old friend George Weis has promised a nice prize as well, it's a secret until next month because George ordered it special from the factory for us and wanted to make sure it arrived. Confirmations on some other prizes are in, but the prizes are not here yet, so until they are we would rather not build up to a let-down. This is a promise though, the December issue will have them ALL listed.

As we are getting this copy off here comes the mail man with a letter from that old 16-mm man (put 'em in backwards) Leo Meyerson of World Radio, Council Bluffs, Iowa. Remember last month we told you about his offer of the new B and W Grid dipper? Well, it arrived and just as he hinted in the letter there also were some beautiful cash merchandise orders, two $10 ones and a $5 one good for anything you want. Say, fellows, that's over ten big prizes already! Stop a sec and figure just how much moola those dandy prizes represent, let's be fair too, and give any of these boys whatever business we can.

While one of our prizes is the Rothman kilowatt modulator, W6LYD of Local 401 is using the little Rothman modulater on his mobile and what modulation!

Here and there: WφGSW Jim Evans of Local 242 is still sending in new IA listings. What we like about Jim is that he sends them along every week or so even if there are only a couple and this makes it a lot easier on us too.

The most asked question we get in the mail and over the air is: "Can you send me a list of the gang?" Well, Brothers, it's this way, IP has time and time again allowed dozens and dozens of extra lists at quite a cost to them. Of course they have been swallowed up, and we just cannot ask them to do this every month, so why not break down and subscribe? You really have to get the copy regularly to keep up on new listings. There is no doubt about it, the list is almost a necessity in the awards and contests. I used to know them all by heart, but no more. I have to refer to it myself; it's just grown too big—wonderful!

Note to you CW men: W6BHV Bill Thompson Local 501, Chico, Calif., is looking for IA-IP CW contacts on 20-40 or 80 and is on every night after 0100 PST. So, OK OK you CW men, send me your calls and Local numbers and what bands and time you are on and we'll fix up a special CW listing for you; and I'll be on it too; send slow! Hi!

It's a pleasant surprise to note how many of the IA gang are CW men only and work hard at it. Personally I work both phone and CW and am ashamed to say that it has been too many years since I pounded brass, it's just like a new world all over again. Try 21 MC it's great (when anyone is on); we hooked a VQ4 with S9 both ways recently on that band. But how could the gang get what they have off of their chests on those midnite QSO's especially on the Coast here with CW? Phone has its merits too.

A few pree-dictions (none accurate) ten is opening this fall. 15 meter band will be FB for fone when the FCC releases it. 75 is really going places right now, we hear 695 and 150 men (IA) in contact with Eastern men almost nightly on 75.

We finally, and accurately, predict that this year's big contest is going to be a wow and not only because of the FB prizes but mostly due to the swell spirit shown by the IA gang.

Note that the IP list fits nicely in your regular log pasted to one page and on the other side plenty of room to paste the additions listed monthly. Cannot promise how soon, but if you don't have the complete list send us your name at once; be sure and include your Local number too.

73.

IA-IP ACHIEVEMENT AWARD BOX SCORE

"Worked 25 IA-IP Gold Award"

W6PFF	Frank Champlain	L. 150
W6MU	A. Houston Barnett	L. 695
W6BAA	Amos Kanaga	L. 409
W6DDQ	Philip Wisdom	L. 695
VE7ALW	Merle Wilson	L. 348
WφGSW	James Evans	L. 242

* * *

"Worked 10 IA-IP Award"

W4PKT	Marion Sanders	L. 507
W1BVB	Don Fancher	L. 439
W6BAA	Amos Kanaga	L. 409
VE7ALW	Merle Wilson	L. 348
W6FOP	George Abrams	L. 297
W6MU	A. Houston Barnett	L. 695
W6PFF	Frank Champlain	L. 150
WφGSW	James Evans	L. 242
WφSJK	C. S. Keay	L. 219
W6LYD	Don Johnson	L. 401
VE3BZJ	L. R. Kilbourne	L. 622

Eastman Personnel Retire

Eastman Kodak Co. announces retirement, after many years of service, of Otto W. Cook, Irving C. Matthews and William H. Zimmer. Cook, 32 years with the company, retired from the post of manager of film manufacturing at the Kodak Park plant. Matthews, veteran of 34 years employment, headed the service section of the chemistry division of the Research Laboratories. Zimmer had been with the organization 41 years, 37 of them in industrial suggestion work, and was regarded as one of the nation's top authorities on industrial suggestion systems.

Nitrate Film Banned in France

All motion pictures imported into France must now be on safety stock, and French laboratories are forbidden to release any new prints except on safety film. The ban on nitrate imports went into effect last month; that on nitrate prints from French laboratories has been in force since June of this year. Non-safety films now in use may continue to circulate but must be replaced by acetate when they wear out. It is expected that in a few years there will no longer be nitrate prints in the country.

May Dub Italian Pics in N. Y.

New York City projectionists may find employment in the not too distant future in a new dubbing studio which Italian Film Export contemplates setting up at an estimated cost of 250 thousand dollars. Currently, Italian-made films shown in the U. S. have their English-language soundtracks (if any) dubbed in Italy.

FLYING SAUCERS

(*Continued from page* 18)

sky. If there is any motion of the air layers, the lights will move across the sky at incredible speeds.

"In newspaper reports which appeared in past weeks there seem to have been a great many of these observations in the East—particularly around Washington, D. C. Why should we see them over Washington when that city is far removed from the desert regions which father mirages? The answer to this question is very likely found in the unbearably hot weather to which we have been subject this summer.

"The advent of the prolonged hot weather simulated desert conditions which gave rise to the mirages appearing over Washington and the eastern seaboard, and the flying saucer scare was on again. . . .

"The problem of their appearance on radar screens has set many people wondering. . . .

"During the last war it was not uncommon for the radar screens to pick up 'twilight ghosts.' Almost every evening, when the sun set, there would appear sharp 'pips' or 'blips' which would last for perhaps 10 minutes. This effect was most pronounced in the tropics, again where there was the maximum possibility for a temperature inversion. There are many effects in radar scanning which cannot be explained.

The Psychology of It

"There is one interesting aspect in the reports on the flying saucers. About 100 years ago the famous Durham Lights appeared over northern England. The century before, 'lights' were seen by the French. Now Americans are seeing weird lights . . . in every case the lights were seen by the people of the leading nation of the world at the time. It may well be that people who have most to lose from a change are the very ones most likely to see mirages.

"Up to this point we have mentioned only the lights which appear at night. Flying saucers have also appeared in the daytime. But in every case the source was found to be a meteorological balloon, a very high flying aircraft, or particles of dust or spiders which float lazily through the air in the general vicinity of the sun. The daytime appearances of these objects have not been a problem—the problem is strictly one of the night lights and these can be explained as mirages.

". . . Why do not the people of the other countries see these objects? With the answer will come an understanding which will remove the fear and hysteria the flying saucers have engendered."

16-mm Films in Germany

Post-war Germany is making extensive use of 16-mm films for educational purposes, according to Nathan D. Golden, director of Motion Picture and Photographic Products Division of NPA, who bases his findings on a report received from the US high commissioner for Germany.

Approximately 11,000 schools in Western Germany have 16-mm projectors, and State Film Offices own another 12,500, Golden reveals. These are silent projectors, but State Film Offices also own 260 sound 16-mm projectors which are available to schools.

Some 550 educational 16-mm films are used annually in primary schools and high schools, and about 200 in colleges and universities. Between 50 and 60 educational 16-mm films have been produced since the end of World War II. An exchange program has been established between Germany and private companies in France and Sweden; and between Germany and government agencies in Britain, Netherlands, Switzerland, and Austria, the bulletin issued by the NPA reveals.

Central educational film library in Western Germany is the state-financed and controlled Institute for Film and Pictures in Munich. The Institute serves State Film Offices, which in turn serve 455 county and city film centers throughout the country.

New Rental Film Catalog

A new catalog of 16-mm and 35-mm sound and silent prints available for rent has been issued by the Museum of Modern Art Film Library, 11 West 53rd Street, New York. Titled "Circulating Film Programs," it is a 34-page booklet listing memorable films dating from the primitives of 1895 to modern sound pictures.

Similar series of French, German, Russian, English and Swedish films are also listed; and there are series of comedy, animated and propaganda films. Most of them are available in either 16-mm or 35-mm gauge. The catalog also sets forth the terms on which these films may be rented; they cannot be shown for paid admission but may be presented before paid-membership "film groups" and other institutional audiences.

An earlier Museum of Modern Art catalog, "Documentary and Educational Films," still available, lists an even wider range of materials, also available for "non-commercial" showings only.

Foreigners Modernize, Vallen Finds

Foreign theatre-owners are extensively modernizing their houses, E. J. Vallen, president of Vallen, Inc., reports in a review of his company's business during the first three quarters of 1952. Vallen curtain controls and tracks are currently being bought by theatremen in Caracas, Lima, Manila, Karachi, Mexico City and Chittagong, among others, Vallen reveals. Lima and Caracas sent double orders, for modernization of two different theatres in each of those cities; those at Lima, the Biarritz and the Paris, being reputedly the most luxurious in Latin America.

LETTERS TO THE EDITOR

(*Continued from page* 18)

image, good light, clear sound. Let's get down to business, boys, and *sell* every picture we exhibit. The man down in the front office may wear a nice suit with a flower in the lapel, and the cashier may be the boss's daughter, but we, the men in the projection room, are the whole works in this complex machine. We are the silent showmen, the key to the vast horizons of entertainment; we bring laughter, gayety or sadness to a world of eager eyes. Upon us rests the responsibility of fulfilling what the marquee offers: good clean entertainment—the best show in town, fella—smart showmanship begins in the projection room!

RAYMOND PEQUE
65 Liberty Street
Lodi, N. J.

SAFETY FILM: PERFORMANCE CHARACTERISTICS

(*Continued from page* 7)

Someone is right and someone wrong, or maybe both parties are half right and half wrong. Every projectionist has plenty of reason to squawk at some of the prints we get—yours truly has indulged in plenty of this squawking himself—but haven't bad prints always been with us?

Remember that all of us encountered bicycling of prints, exchange-made splices that readily came apart, torn perforations, bent and roughened edges, *etc.*, long before nitrate got kicked in the pants by high-acetyl. Ask any old-timer what the prints were like in the days when slides were shown between reels. When film breaks are the rule, rather than the exception, that's bad. And film breaks *were* the rule in those days.

Nitrate vs. Safety Stock

To get to the point: Is it true that safety film wears out more quickly than nitrate film? One would naturally think that the answer to this question would be an unequivocal *yes* OR *no*, but if we base our conclusions on this simple premise we shall certainly soon find ourselves tangled up in an intricate web of hopeless contradictions. Better, then, to propose a paradox by saying that the correct answer is *yes* AND *no*, and then see if any intelligent conclusions can be reached by this line of reasoning. The rules of this game demand that we stick to facts. Here are a few:

The projection life of safety stock has been found to compare quite favorably with that of the very best nitrate stock. And even though it is true that the sprocket-holes of safety film fracture more readily than those of nitrate film, *safety prints are seldom junked because of general perforation failure,* unless they have been subjected to some undue mechanical strain which could be equally harmful to nitrate film.

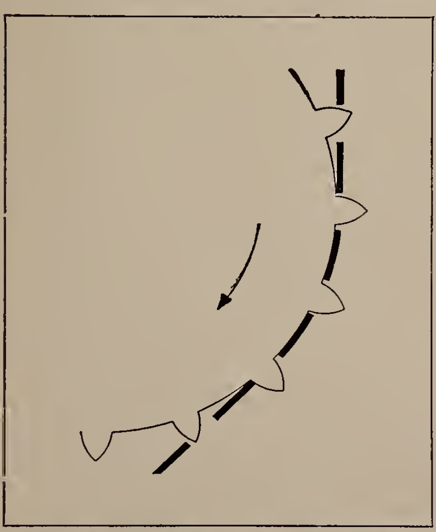


Illustration of excellent fit of older type film having higher shrinkage with a standard 0.935 inch diameter sprocket.

The authority for these sweeping statements is the Eastman Kodak Company. Every other manufacturer of high-acetyl stock will undoubtedly underwrite them. We are, however, free to remain skeptical and probe a little more deeply into the subject. Which is exactly what we intend to do in this article.

Every projectionist who is not a newcomer to the field can recall cases where new nitrate prints had been practically ruined during their first run simply because gate tension was too great and the teeth of the intermittent sprocket, and the holdback sprocket of the sound-head, were hooked, tearing the perforations. Slight fractures at the corners of the perforations, however, did not interfere with picture quality, but longer cracks resulted in an unsteady picture whenever gate tension was excessive. It has been the writer's experience that the perforations of high-acetyl safety film must be very badly fractured indeed in order to produce an unsteady picture when gate tension is normal (12 to 16 ounces).

When the old 0.935-inch diameter intermittent sprockets are used, safety film has approximately 81% of the projection life of nitrate film, when both types of film are run until breakdown of the perforations occurs. The shorter life of the safety film under these conditions is due, not only to its lower tear-strength, but to the greater shrinkage of the nitrate film, giving nitrate the advantage of more nearly fitting the 0.935-inch intermittent sprockets. But with the new 0.940- and 0.943-inch intermittent sprockets, safety film gives a better fit. This increases the projection life of safety film to from 85% to 90% that of nitrate when both films are run to breakdown.

The advantage of the larger 16-tooth intermittent sprockets in increasing film life is not so great as was first supposed. At any rate, the projection life of safety film may, for all practical purposes, be considered to be "about the same" as that of nitrate film, when both films are run over and over again until they break down completely. Needless to say, films are not run to complete breakdown in the theatre.

As far as the *useful* life of a print is concerned—a matter of the utmost practical value to the projectionist—it may be said that there is little if any difference between safety and nitrate prints. After so many runs under average conditions, the safety print suffers from fractured sprocket holes and the nitrate print becomes shrunken and buckled. Of the two evils, slightly checked perforations is without any doubt the lesser.

Most prints are junked because they have played their bookings and are no longer wanted. Everyone has seen the picture; and in the case of the average movie, no one cares to see it again. (Outstanding productions, likely to be reissued, can always be reprinted on fresh stock.)

In most cases a few prints are saved. only the badly worn ones going to the film salvager, the junk man, or the local TV station. Storage would present a tremendous problem if every print of every picture were saved. In the days before 16-mm film, used theatre prints could be bought for home use at prices ranging from 50c to $2.00 per thousand feet. Some exchanges would even give them away just to be rid of them.

Why Prints Are Junked

A print of a picture which is in demand is junked if it becomes so badly damaged that projectionists refuse to run it. In such cases the entire print. or at least the most badly damaged footage, must be replaced by the exchange which farms it out. The causes of film damage have been discussed a number of times in IP, and do not concern us here.

This writer does not hesitate to admit that his most recent experience in projection rooms has been pleasant as regards the general condition of prints. From the time that high-acetyl safety stock came into general use—Eastman abandoned the manufacture of nitrate stock entirely in 1950—subsequent-run prints seem to have fewer and better splices than the subsequent-run prints of nitrate days. There are conspicuous exceptions, of course; but these have always been with us.

(*Continued on page* 33)

Illustration showing poor fit of present low-shrink film with standard 0.935 inch diameter sprocket. Note interference of top tooth.

TESMA's Huge Equipment Show

MORE than thirty exhibits displaying hundreds of equipment items of direct and immediate interest to projectionists, are scheduled to be shown at the TESMA-TEDA-ASA trade show and simultaneous conventions in Chicago's Morrison Hotel, November 15-19.

Allied States Association of Motion Picture Exhibitors, Theatre Equipment and Supply Manufacturers Association, and Theatre Equipment Dealers Association confidently expect this to be the largest and best attended showing of motion picture theatre equipment and fittings ever staged, since for the first time the three large organizations have united behind a project of this type. There can be few, if any, articles of theatre equipment on the U.S. market that will not be shown or at least represented in Chicago this month.

Top personnel of the most important equipment manufacturing and sales organizations will be on hand to greet visitore and to explain their products. Most companies exhibiting will also provide inquirers with abundant literature setting forth the technical as well as sales-appeal details of the equipment or supplies they offer. A number will offer all comers samples of their merchandise, or souvenirs, or both.

Entertainment features of the joint convention include an open-house cocktail party by National Carbon Company, followed by an all-industry banquet on the evening of November 19; and general hospitality in various hotel suites by a great many of the manufacturers and dealers.

Displays of direct interest to projectionist, their planned booth locations, articles exhibited, and personnel in attendance at each, include the following:

Roy Boomer, Secretary, Theatre Equipment and Supply Manufacturers Association

ASHCRAFT MFG. CO. Second Floor, 8 and 9. Arc lamps. Clarence and Mary Ashcraft.

AUTOMATIC DEVICES CO. First Floor, 140. Curtain machines, travelers and controls. A. Samuels.

BALLANTYNE CO. First floor, 124-127. Projector, drive-in amplifiers, in-car speakers. J. Robert Hoff.

BAUSCH & LAMB OPTICAL CO. Second floor, 25. Lenses, condensers, reflectors. M. H. Stevens and others.

CENTURY PROJECTOR CORP. First floor, 10. Projectors and sound equipment. W. D. Hausler and L. W. Davee.

DEVRY CORP. First floor, 119. 35-mm and 16-mm projectors. W. C. DeVry, E. W. D'Arcy and Clare H. Roloff.

GOLDE MFG. CO. Second floor, 52. Rewinds, spotlights. E. M. Goldberg and H. Bob Engel.

CORDOS CORP. Second floor, 60. Rectifier tubes. George B. Marchev.

HAL I. HUFF MFG. CO. Second floor, 76. Carbon water cooler and projection accessories. Hal Huff.

INTERNATIONAL PROJECTOR CORP. First floor, 78-82. Projection and sound equipment. Arthur E. Meyer.

KOLLMORGEN OPTICAL CO. First floor, 145. Projection lenses. J. A. Fetherston and others.

LAVEZZI MACHINE WORKS. Second floor, 54-55. Projector replacement parts and assemblies. Tom and Bob LaVezzi, and Jake Mitchell.

LORRAINE CARBONS. Second floor, 51. Projection carbons. Ed Lachman and George Walters.

J. E. MCAULEY MFG. CO. First floor 78. Projection arc lamps, 40-200 amperes. Charles A. Hahn.

MOTIOGRAPH, INC. First floor, 109-111. Trad 40-inch lobby television. Fred, Thor and Douglas Matthews, James Huckleberry, Frank Riffle, Jack Behlke, and George and Victor Trad.

NATIONAL CARBON CO. First floor, 146-147. Projection carbons, Eveready batteries and flashlights. J. A. McNamee and others.

NATIONAL THEATRE SUPPLY CO. First floor, 78-82. Projectors, arc lamps, drive-in equipment. Walter E. Green, R. L. Bostwick, J. E. Currie, L. C. Ownbey, and J. E. Turnbull.

NEUMADE PRODUCTS CORP. First floor, 14-15. 35-mm and 16-mm rewinds, projection room accessories. Oscar Neu and L. E. Jones.

RADIO CORP. OF AMERICA. Second floor, 5-7. Theatre television, projection and sound equipment. Jack F. O'Brien, Barton Kreuzer, Ralph Heacock, and others.

RAYTONE SCREEN CORP. Second floor, 16. Screens, screen surrounds. Sol Shurpin and Leonard Satz.

J. E. ROBIN, INC. Second floor, 48. Motor-generators.

B. F. SHEARER CO. First floor, 107. Projection screen, projection and sound equipment. T. L. Shearer.

STRONG ELECTRIC CORP. First floor, 150-151. Projection arc lamps, arc slide projector, arc and incandescent spotlights, rectifiers. Harry H. Strong, Arthur Hatch, and others.

WENZEL PROJECTOR CO. Second floor, 45. Projector mechanisms, soundheads, magazines, rewinds. Fred Menzel, C. J. Williams, and others.

THEATRE Tv, STEREO, PROMISE MORE JOBS

(Continued from page 10)

ods of achieving the illusion of three-dimensional projection appeared in IP for February, 1952 (page 9) and March 1952 (page 20). Polaroid-spectacle stereo, however, works—provided the patrons are willing to wear the spectacles. Other methods are still in the questionable stage.

In spectacle-stereo two separate images appear on the same screen. They are slightly displaced with respect to each other. The naked eye sees an intolerable blur. The spectacles, however, separate the images and each eye, through its appropriate pola-filter, sees the image intended for it. It is possible to print the two sets of images on the same film, either side by side, or alternating vertically; and where this is done two projectors are used and film threaded normally and no increase in projection staff is required. But light is lost.

To maintain full normal illumination two projectors are used, one for each set of images; four in all to allow for changeovers. Where there are four projectors to be threaded, four lamps to trim, and two prints to inspect, rewind and patch, it is evident that the projection crew must be increased. In fact, the obligations are substantially doubled—in some respects, more than doubled, since the two films running simultaneously must be in absolute synchronism and must be kept identically framed; and this involves a degree of care in threading, patching and monitoring much more exacting than in normal projection. A double-size crew would be in order.

Cinerama

Cinerama in its present form uses four projection rooms. The minimum operating staff therefore consists of six; one man in each projection room, one at the image-control console in the pit and one at the stereosound control console. Regardless of conceivable and as yet unvisioned improvements in technique that might at some future time permit use of a smaller operating staff, heavy demands are imposed by the maintenance requirements of three projectors, three lamphouses, an independent soundhead, three amplifiers and six speaker systems. With all that gear to be cleaned, kept in adjustment, watched during operation, and serviced with such elementary servicing as does not justify calling in a service inspector, Cinerama cannot have a small projection staff.

A four-man shift would seem to be the bedrock minimum within any reasonable future—one to each of three projection rooms (eliminating the fourth room), and one to manipulate a combined picture-and-sound control console assuming that such combination, which now does not exist, is someday achieved; all four men cooperating in overall maintenance. And this would be bed-rock minimum, not a practical working staff with reasonable slack in it to allow for contin-

gencies. As a practical matter, Cinerama no doubt will always require either a five- or more probably a six-man shift.

Stereosound

In its original form stereosound was provided by a triple track on the regular film and a fourth or control track on a separate 35-mm film that was threaded into a separate soundhead. This meant two reels to thread for each changeover instead of one—and, moreover, they had to be threaded in exacting synchronism. A minimum of three amplifier channels and three speaker systems completed the installation.

The added operating function consisted of the threading, rewinding and (when necessary) patching the extra or control film, and assuring its synchronism with the soundtracks it controlled; additional maintenance involved the supervision, cleaning and elementary servicing of three times the normal amplifier and speaker equipment, as well as of an additional soundhead and drive motor.

Resultant manpower requirements would thus seem to call for a third projectionist.

Combination Requirements

If two or more of the above innovations are to be added to the same projection room, the *operating* manpower requirements would be those of the equipment needing the largest number of personnel, since only one of these equipments would be operating at any one time. Thus, if the same theatre had *both* Cinerama and polaroid-spectacle stereoprojection, obviously the six-man Cinerama crew could take ample care of the stereo show which needs only four men.

Maintenance manpower naturally does not follow the same rule, since the more equipment is in the theatre the greater the demands of cleaning, supervision, replenishment, adjustment and elementary maintenance. Thus, a Cinerama-equipped theatre might also have so much additional equipment that six men, although they might be able to operate it all, could not take care of all.

Projectionist Specialization

If experience of allied industries can serve as a guide, the projection craft may possibly stand now on the verge of specialization. Personnel practices in radio broadcasting may serve as an illustration. In the earlier days of that craft, the same man might alternately serve with a field microphone crew, or at the transmitter control board, or in or behind the sound studio. These jobs are all specialized now, at any rate in the larger stations. In such stations, in fact, the transmitter control board may be located many miles away from the studio.

If the projection craft is similarly to specialize under the pressure of so many

diverse additions to projection room equipment the manpower estimates suggested above may have to be further increased. The fact that there are, for example, six Cinerama-projectionists in a theatre, will not necessarily mean that these men can also work the film-intermediate developer machine. They may not know how. That may be another and different specialty.

Question of the theatre budget, and of its ability to hire all this quantity of diversified and specialized manpower, ties in with the general prosperity level of the nation and does not depend on the theatre industry alone. The commonplace equipment of today's most neglected projection room—motor-driven projectors, automatic-feed arcs, sound amplifiers and the like, would have been economically impossible in the hand-cranked nickelodeon days. Bought second-hand it would have been impossible. In those days the country was not rich enough to pay more than 5 cents per ticket for its entertainment, and a store fitted with undertaker chairs and a bedsheet on the front wall did a fair night's business if it grossed four dollars. How much could that place afford to pay for its equipment, or how many projectionists could it hire?

Who Pays for All This?

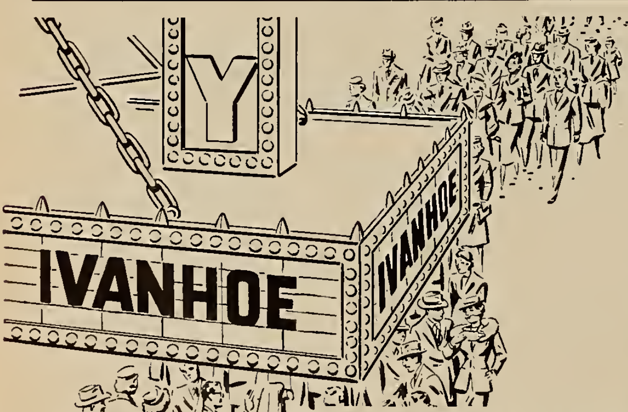
Today the American people can afford and pay roughly an average of 50 cents per ticket for entertainment. On Broadway, New York, at this moment of writing, they are happily paying $1.20 to $2.80 for a ticket to Cinerama and standing in long lines for the privilege. How much they are willing to pay for stereoprojection and how many of them are willing to pay it will be tested in Los Angeles and Hollywood this November and reported in these pages in December.

In short, if the public wants it, and is willing and able to buy it, the kind of theatre entertainment that requires three, four or eight projectionists per theatre can be supplied; and that number of jobs per theatre can come into existence. Whether the public wants to buy such entertainment depends on how attractive this industry can make it; whether they are able to buy it depends on the economic condition of the nation.

Gates Resigns from Kodak

Allen B. Gates for 22 years Eastman Kodak Company's expert on management training, has retired. Gates's basic philosophy of management, which he introduced to Eastman Kodak in the early 1930's, still forms a foundation for the company's training program for supervisory and management positions.

World-famous in his field, Gates was American delegate at the 9th International Management Congress in Brussels, last year; and had previously served as delegate to the 7th International Management Congress at Washington in 1938. He is a graduate of Purdue, post-graduate alumnus of University of Illinois, and during the recent war served as consultant to the Office of Production Management, War Manpower Commission, and the Oak Ridge operation of the Atomic Energy Commission. At home he has served as member and president of his local school board, and on several committees of the Rochester Chamber of Commerce.



Servicing in Emergencies

If sound turns noisy, suspect switch contacts. Manipulate or disturb as many as possible; open and reclose those that can be opened without harm to the show. If increased noise indicates that the faulty contact has been found, jump it (if possible) until a regular replacement can be made.

Those intermittent troubles that obstinately refuse to show up while the service inspector is present sometimes need heroic treatment. If there is a possibility that tubes can be at fault, change all of them. If trouble-free performance then continues indefinitely the old tubes can be put back in service one at a time only and only at well-spaced intervals, until return of the trouble indicates which tube was to blame. If changing all tubes at once does not eliminate the difficulty, a similar wholesale replacement (but without discarding the replaced parts) can sometimes be made of all resistors, condensers, etc., in a suspected unit, and these also replaced one by one until the faulty one is found. Meanwhile, the show goes on.

Interference with the sound from nearby television or radio broadcasting, or X-ray or diathermy machines, can sometimes be reduced temporarily by disconnecting ground connections of the sound equipment. In addition to a common or master ground at some water-pipe there will be local grounds on individual equipment items, often via connections to electrical conduit or cable. Many of these can be opened, temporarily, to abate the nuisance until more permanent remedies are achieved.

An extension cord of suitable length, such as is sold in dime stores with plug and receptacle at either end, makes a handy emergency gadget in case of power supply trouble. In many projection rooms it can be used successfully to "patch over" equipment to another and operative power circuit until such time as regular repairs can be made.

If standard electricians' rubber and friction tape is not on hand when needed, scotch tape from the manager's office or court plaster from the medical first aid kit will serve temporarily.

Small springs that hold pad rollers, etc., properly closed can sometimes be replaced in emergency by rubber bands suitably positioned. Needless to add, this procedure is definitely not recommended except where there is no other way to save the show!

AMERICAN LABOR MOVEMENT

(*Continued from page* 17)

with the American Federation of Labor. The committee was later joined by four additional AF of L unions.[1]

The executive council of the AF of L characterized the activities of the Committee for Industrial Organization as "dual" to the AF of L and in January 1936 requested the Committee to disband immediately. The CIO rejected the request. The 10 international unions officially participating in the work of the CIO were suspended from the AF of L by the executive council in September 1936 and this action was upheld by the convention in November of the same year.

The CIO held its first constitutional convention in November 1938. At this convention the Committee for Industrial Organization was reorganized as a federation of national and international unions under the name "Congress of Industrial Organizations." The new federation included 9 of the 10 unions suspended from the AF of L and some 32 other groups or "organizing committees" established to recruit workers in various industries. The International Ladies' Garment Workers' Union did not affiliate with the CIO and returned to the AF of L in 1940.

John L. Lewis, president of the United Mine Workers, was elected to lead the CIO. The constitutional structure of the new organization resembled the AF of L in providing basically for a loose federation of autonomous national unions governed by an executive board composed of a representative from each affiliated union, a board of nine vice presidents, a secretary-treasurer, and president, all elected at annual conventions of delegates from affiliated unions.

Rivalry Promotes Unionization

The difficulties between the AF of L and the CIO did not retard the growth of unionism. In fact, in many ways the rivalry generated by the two large federations stimulated the organizing efforts of the unions in each camp. By the end of 1941, estimated total union membership had climbed to between 10 and 11 million. This was more than double the membership at the time the Committee for Industrial Organization began its campaigns in the large steel, automobile, and textile industries.

With the increased recognition of unions, relations between labor and management gradually improved. The "sit down" strikes which had occurred during the first flush of unionization in some of the mass-production industries subsided. Many unions had won "recogtion" and more and more workers were protected by written agreements setting forth their wages, hours, and working conditions.

Despite these gains, which were real and substantial, the number of strikes remained relatively high. In 1941, as prices began inching upward and production and profits rose, stimulated by the war in Europe, stoppages again became more frequent. A few of these controversies were provoked by Communist sympathizers who, before Hitler's attack on Russia in June 1941, favored an "isolationist" policy (after the German invasion of the Soviet Union they became full-fledged "interventionists"). Most of the prewar labor-management conflicts, however, revolved around demands for better wages and greater union security.

[TO BE CONTINUED]

[1] The unions active in the formation of the CIO were: United Mine Workers, represented by John L. Lewis, who was chairman of the organization; Amalgamated Clothing Workers; International Ladies' Garment Workers' Union; United Textile Workers; International Union of Mine, Mill and Smelter Workers; and International Association of Oil Field, Gas Well, and Refinery Workers. Two union officials, Charles P. Howard of the International Typographical Union who became secretary of the committee and Max Zaritsky of the United Hatters, Cap and Millinery Workers, participated as individuals without committing their organizations to the movement. The following four unions joined shortly after the formation of the committee: International Union of United Automobile Workers, United Rubber Workers, Amalgamated Association of Iron, Steel and Tin Workers, and Federation of Flat Glass Workers.

SAFETY FILM

(*Continued from page* 27)

Damage to the edges of the film seems to be on the increase, however. Some of this damage is due to uneven rewinding, but most of it can be laid at the door of the distributor who continues to keep bent shipping reels and old-fashioned and battered shipping cases in service. Distributors are prone to blame the projectionist for all film damage, but their accusations seem ridiculous so long as they force the projectionist to extract the reels of film from the cases by the use of hammers, pliers, and the like.

Picture Quality

Many projectionists have asked, "Are the pictures printed on safety film "fuzzier" than those on nitrate film?" The answer is an emphatic *no.* The photographic emulsion is the same no matter what the base, which merely serves as a transparent support for the emulsion.

Because of the general absence of buckling and severe embossing in modern safety film, it should be much easier to maintain a sharp focus on the screen with safety film, especially when powerful lamps are used, than would be possible with nitrate film. There are times when fuzzy processing and printing cause fuzzy images on the film, but that has nothing to do with the safety *versus* nitrate question.

To sum up:

(1.) Safety film is far superior to nitrate film in that it eliminates all fire-hazard.

(2.) Safety film is far superior to nitrate film because safety film is a *permanent* record and can be stored under less exacting conditions.

(3.) Safety film is very much superior to nitrate film as regards shrinkage characteristics and tendency to become brittle.

(4.) Safety film is superior to nitrate film in that it does not readily buckle.

(5.) Safety film is slightly inferior to nitrate film in that it is more sensitive to irregularities of the gate film-runners and pad tension (i.e. it is more difficult to hold flat over the aperture.)

(6.) Safety film is superior to nitrate film in regard to constancy of focus and general resistance to the conditions which induce flutter.

(7.) Safety film is inferior to nitrate film in that it cannot be spliced so rapidly and that the present scarcity of triacetate solvents requires extra care in formulating safety-film cements.

(8.) Safety film is somewhat inferior to nitrate film in tear strength, hence the perforations of safety prints break down before those of nitrate film.

(9.) Because of the superior qualities of safety film in several respects, safety film has approximately the same useful projection life as nitrate film.

(10.) The photographic quality of safety and nitrate film are equally good. But safety film is superior to nitrate in that the photographic emulsion is more stable on safety film. Nitrate base decomposes spontaneously to give off products which cause both unexposed and processed emulsions to deteriorate.

SUMMATION: In general, the inception of high-acetyl safety film marks a distinct advance in motion-picture technology. The new film is in most respects more desirable for theatre-release prints than the old nitrate film.

THE END

More Reel Production Seen Needed

Facilities for production of reels need to be expanded, the Department of Commerce's National Production Authority was advised recently by its Reels and Spools Industry Advisory Committee. The industry manufactures a variety of products ranging from little typewriter ribbon spools to giant 14-foot structural steel reels for heavy cables; but one of its most important customers is the motion picture industry with its heavy consumption of film reels, the NPA was told. Current deliveries are 30 to 45 days late.

UNDERWRITERS' BULLETIN ON CELLULOSE ACETATE FILM

(*Continued from page 7*)

portance from the fire and life hazard standpoint. Furthermore, great volumes of explosive and toxic gases are given off from decomposition of nitrate film, especially in a restricted supply of air, thus contributing to the life and fire hazard.

The rate of combustion of cellulose acetate film is relatively slow and the amount of heat evolved is of a low order, being much less than that of paper or wood.

The most important safety factor with reference to cellulose acetate film, is in its slow combustion, and any fire can be easily extinguished by the application of water or smothering, much in the same manner as fires in ordinary combustible materials.

Precautions Still Needed

The time will, no doubt, come when nearly all pictures will be on safety film, but there may be nitrate films in circulation for some time and because of this every precaution should be taken to avoid any relaxation in the regulations prescribed and methods imposed for the safe handling of flammable nitrate films.

The safety factor supplied by the new acetate film can be taken advantage of by arranging its storage apart from any nitrate films. By this segregation, loss possibilities will definitely be reduced, and as nitrate inventories are progressively diminished their isolated confinement will tend to further control hazard possibilities.

In existing film exchanges, this segregation can be readily controlled by having separate film vaults for safety and nitrate films, and marking their doors with the words Safety Film in *green*, or Nitrate Film in *red*.

Similar isolation of safety films from nitrate films can also be practiced using specially identified rooms for the safety film with such measures for protection against loss as may be desired. Small amounts of safety film can be appropriately stored in ordinary steel filing cases but if they are of high value specially protected cabinets of the type designed for film storage should be given consideration.

In order to insure the degree of safety now provided by the new film, it is suggested that all safety films be unmistakably identified by reel bands bearing in prominent letters the words, SAFETY FILM printed in bright green. All record cards and other control items that pertain to these films should also be printed in the same green color and bear as their main feature the words SAFETY FILM. In contrast, all flammable nitrate films should be equipped with reel bands printed in bright red with the words NITRATE FILM, with their record items correspondingly identified.

Film handling personnel working under this plan for segregating the two types of film should take special care to prevent intermixture of the two types, and there should be exacting supervision of storage facilities to minimize all possible loss. By positive and intelligent management the safety factor provided by this new film base can immediately benefit all engaged in motion picture film activities.

If such a plan for careful segregation is not followed, any place where both types of film are handled should follow for all film the safety precautions prescribed for nitrate film.

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R. A. ENTRACHT, Business Manager

Sworn to and subscribed before me this 13th day of October, 1952.

(Seal) ANNE CORRIGAN

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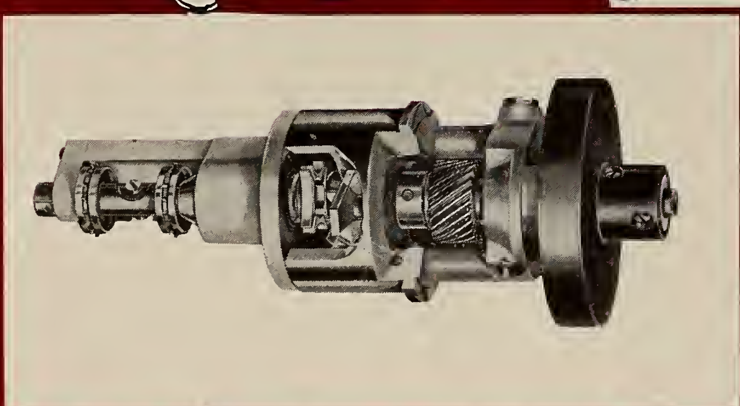

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DECEMBER 1952

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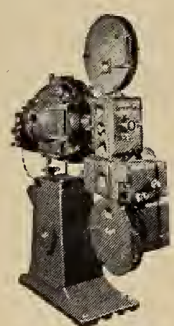

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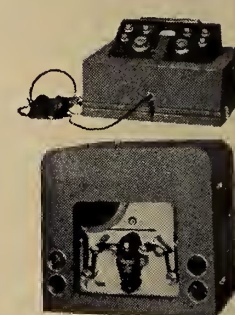

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MONTHLY CHAT

THIS corner having yammered for years that only technological advancement can keep our industry prosperous we are gratified to be able to report elsewhere herein still another example of technical progress. This latest step forward—or at least onward—is the new RCA Synchro-Screen for large theatres, demonstrated at the RKO 58th Street theatre in New York early in December. Several circuit executives present displayed so much awareness of the importance of technical changes as to place orders for numbers of the new screen on the spot.

The technical advantages (or drawbacks, if any) of Synchro-Screen are reviewed on another page. This chat confines itself to the relationship between such developments and the overall prosperity of the industry. First and foremost, this is show business, and it is a general rule that to stay in show business it is necessary to keep giving 'em something new. There are many exceptions to that rule: Uncle Tom shows ran for two generations or more; Gilbert and Sullivan are still running; the good old Westerns will perhaps keep grinding to eternity unless space operas displace them. But these exceptions do not contra-indicate the general proposition that novelty brings 'em in. Synchro-Screen is a glaringly visible, conspicuous novelty! All that it needs is exploitation—they'll come to see what it's like if they hear it talked about.

Second point about this particular development is that it is not very expensive—about twice the cost of a regular screen, more or less. Thus the theatre that needs a new screen anyway, or that soon will need one, can put in this novel variety and by playing on its curiosity-value should bring in enough additional "let's-see-it" admissions to pay a fine profit on the extra cost.

A continual process of such innovations could restore to the theatre the freshness, the ever-changing novelty and excitement that it lost during those stodgy years when the motion picture had almost no competition. Responsibility for putting such appeals before the public can't be wholly shoved off on Hollywood; often, as in the present case, the responsibility lies wholly with the exhibition branch of the industry.

The inventing and manufacturing components of the exhibition branch are certainly willing to do their share; the instantly- favorable reception given to the new large Synchro-Screen by circuit executives attending the demonstration is a wonderfully hopeful indication that theatreowners also now understand theirs.

We wish Synchro-Screen every business success; we hope its novelty-appeal will very swiftly pay its purchasers a profit on their investment; and that they will then promptly invest in further new developments that will bring them additional profits. Has there ever been any other road to continual progress and prosperity?

★ ★ ★

Greetings for Christmas

and Best Wishes for

Prosperity and Security for 1953

from

CHICAGO LOCAL UNION NO. 110

I.A.T.S.E. & M.P.M.O.

EUGENE J. ATKINSON

Business Representative

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INTERNATIONAL PROJECTIONIST

VOLUME XXVII DECEMBER 1952 NUMBER 12

Progress Report No. 2

Projector Mechanisms Have Improved

Uncounted thousands of theatres throughout the U. S. and Canada are using outmoded projector equipment—mechanisms that have been superseded by improved models. Exhibitors, not being technicians, do not always know that these improvements exist and are real and highly valuable. The projectionist, however, does know. Here then, for those thousands of readers who have been trying without success to tell the boss that they need new heads, are the facts.

By LEROY CHADBOURNE

AS LONG as there has been projection, there has been improvement in projectors. The process never stops and never can. As long as science produces improved alloys, better lubricants or lubricating methods, and new and superior mechanical and electrical contrivances, so long will projector manufacturers continue to bring out new models that put a better picture on the screen, are less likely to break down in operation, are less expensive to maintain, or are longer-lived.

In other industries, as in the case of automobiles or clothing, new models or styles are brought out yearly principally for the purpose of inducing buyers to discard the old and pay for the new, and not not because there has been a fundamental improvement each year. Projector manufacturers cannot do this. Perhaps they would like to if they could but it's hopeless—they can't.

Automobile and clothing and other industries can persuade the public to replace the old but serviceable purchase, through the device of change in appearance. But a motion picture projector is different—nobody sees it except the men who are paid to look at it. Consequently projector manufacturers can't hope for success with a new model unless they can build into it improvements so basic and valuable that the large circuits, for example, will replace the well-maintained mechanisms in current use. Unless a new model is that superior, the manufacturer can't afford to tool up to produce it. He can never hope to recoup his tooling costs on the basis of a mere change in styling.

Progress, as always, proceeded by steps and stages. Pictured on pages following are two of the oldest of the geneological lines of projector mechanisms. There is, for example, the Simplex. which married the Powers family. The Powers No. 6 Cameragraph had a pin-and-cross intermittent (with solid pin) and an unenclosed mechanism. and was the marvel of 1909.

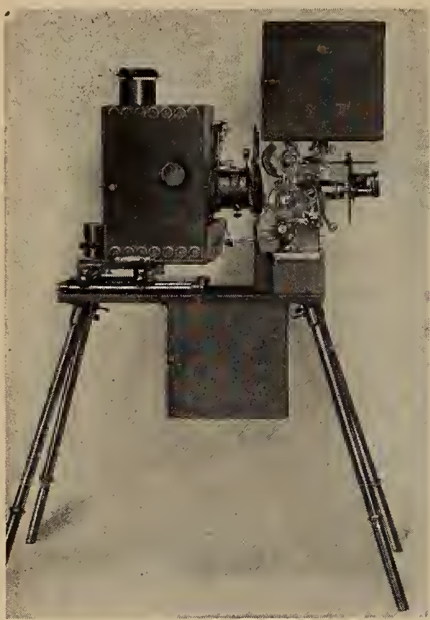
The Powers 6B. also pictured. was the darling of old-time projectionists—and

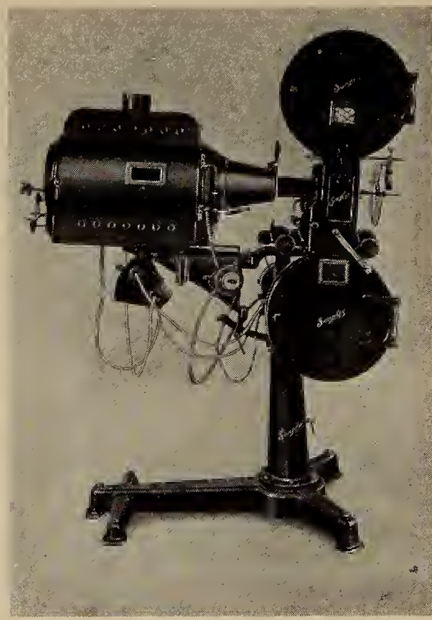
INTERNATIONAL PROJECTIONIST

extends to all its friends

the

SEASON'S GREETINGS





Left, Powers No. 6 Cameragraph, 1909; center, the Simplex Regular, 1910; right, the Powers No. 6B, 1920. A succession of later models, each incorporating important improvements upon its predecessor, bridges the gap between these pioneer units and today's Simplex X-L.

some of the old-timers still swear by it and insist it was the best mechanism ever made, just as there are old timers who think no present car can equal the Stanley Steamer. The 1910 model Regular Simplex is also shown. A grand old gal. There are thousands of them still in use to this day—just as there still are thousands of Ford Model Ts on the highways.

Pictured likewise is the Motiograph geneology—going all the way back to the 1898 Optigraph. Prior to that the company (founded by A. C. Roebuck of Sears Roebuck) had manufactured magic lanterns. It was then (1896) known as the Enterprise Optical Manufacturing Company, a name it retained until it changed to Motiograph in 1936. Pictured with Optigraph is Model "E" (1916).

The Simplex steps and stages in improvement can be traced roughly, model by model, from the Regular of 1910 through the Super, the E-7, and the X-L as follows:

Simplex Improvements

Owing to the increased intensity of arc lighting, the Super Simplex featured a rear shutter to reduce heat at the aperture. Additional cooling was provided by ventilating vanes on this shutter. Oil tubes ran to several central points to improve lubrication; therefore the mechanism needed less maintenance. Durability of performance was further improved by introducing hardened-and-ground intermittent parts—star, cam, and sprocket.

Better, smoother operation was facilitated by introduction of a double framing handle which the projectionist could operate from either side of the mechanism, a framing lamp, focussing knob located at the front and operable from either side, and a focus lock. The image on the screen was improved by means of a longer gate with greater total pad length to produce a steadier picture than was previously available.

The E-7 went beyond the Super to give still greater screen illumination by introducing a double shutter. It provided adjustable gate tension to compensate for films of varying thicknesses. Its one-shot lubrication was a very long step toward completely automatic lubrication, and consequent elimination of premature repairs occasioned by oversight. The projectionist could concentrate his attention more fully on other duties with less distraction from them by worry over whether he had forgotten to lubricate some vital point.

Making the film trap and gate readily removable helped materially toward a cleaner screen image. So did a redesign of the intermittent that reduced chances of oil getting on the film. The picture was further improved by addition of studio guides to the gate to reduce side-to-side weave, and by a number of mechanical innovations which produced the cumulative effect of reducing picture jump in an image 9 feet high to only 1/8 inch, although 1/4 inch is still considered permissible to this day.

The X-L, the latest Simplex, went altogether beyond the E-7 with a wholly new design. Improvements in manufacturing techniques made possible an improved product that previously could not have been produced at a salable price.

Durability and long life were furthered by completely automatic lubrication. With the X-L the projectionist has no oiling to do; he need only make sure there is enough oil in the sump. This needs only a glance at a gauge.

Illumination intensity is still further increased by introduction of a conical rear shutter positioned within 1 1/8 inches of the aperture. This arrangement not only improves illumination above the best obtainable with the E-7 but also reduces the number of gears needed. Ball bearings further reduce friction. The starting load of the X-L is only 1/3 that of the E-7, which again makes for longer life, less maintenance, and a steadier picture over a longer period of time.

Among other highly important details, positions of gears relative to each other do not change on framing, therefore framing does not alter noise, vibration or picture steadiness. There is no fire shutter chatter after any number of years of operation and no need for fire shutter replacement. Because upper and lower sprockets are 24-tooth there is less chance for patches to come apart and stop a show; the gate tension in the X-L is not only adjustable but also duplicable; useful life is prolonged and vibration reduced by redesign of the cam and pin, and alignment between projector and soundhead is further improved.

The work of the projectionist is facilitated by increased visibility and more running lights; he can see the whole length of the film path at all times, and on the drive side he can see the oil mist in operation. A "screen scope" gives him an 8x view of the sharpness of his focus with the new 4-inch-diameter lens the projector is designed to use, and in general makes visible (and therefore correctable) image flaws which otherwise the projectionist could not see.

Arthur Meyer, International Projector Corporation vice president, asks: "What does a theatre gain by keeping the old jaloppies in use—even our own Simplex

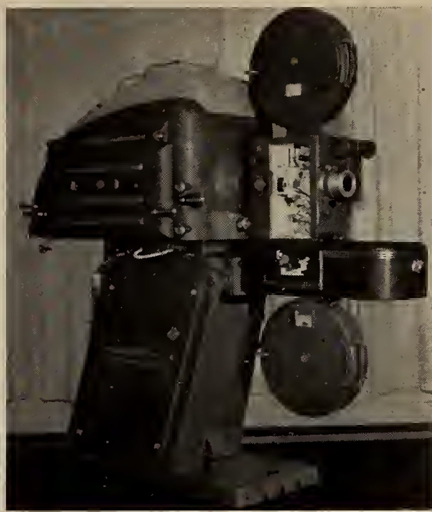
jaloppies? They were good—certainly they were good—but we've done so much better since."

Motiograph Improvements

The Optigraph illustrated herein actually projected commercial motion pictures from 1898 to 1908 even though, as Motiograph's Fred Matthews admits: "it was pretty much of a toy." The Model 1-A replaced it in 1908, and had a front shutter. It also had a lower or takeup reel instead of the Optigraph's gunny sack, which caught the used film any which way as it came down. Model D had a double shutter. But Model E, which came out in 1916 and was the first to be trade-named Motiograph, was also one of the very first motor-driven mechanisms.

Model F, in 1921, featured removable bearings to reduce wear on shafts and studs, prolonging useful life and restoring the quality of the picture at the cost of only nominal repairs in comparison with those previously needed. Performance was further improved by superior arrangements for shutter timing. The Model F base is believed to be the first which had provisions for horizontal and vertical optical alignment.

Model H introduced the barrel shutter, which is still a valued part of the very latest Motiograph, the Model AA. The early barrel shutter was not as efficient from a light standpoint as its successors, but it was very solidly built and extremely simple to time. Framing, also, was simplified and made more accurate in the Model H.



Latest development in a long line of Brenkert mechanisms is this RCA-100 projector.

Model K, introduced in 1936, featured the first double-bearing intermittent movement, for better and steadier images. But Motiograph also boasted of the ease and simplicity with which the projectionist could make adjustments and repairs, even serious repairs. There is a human factor involved; a machine that is more easily repaired is more likely to be repaired, and repaired sooner; thus it should give a better show over a longer period of time and its useful life be prolonged.

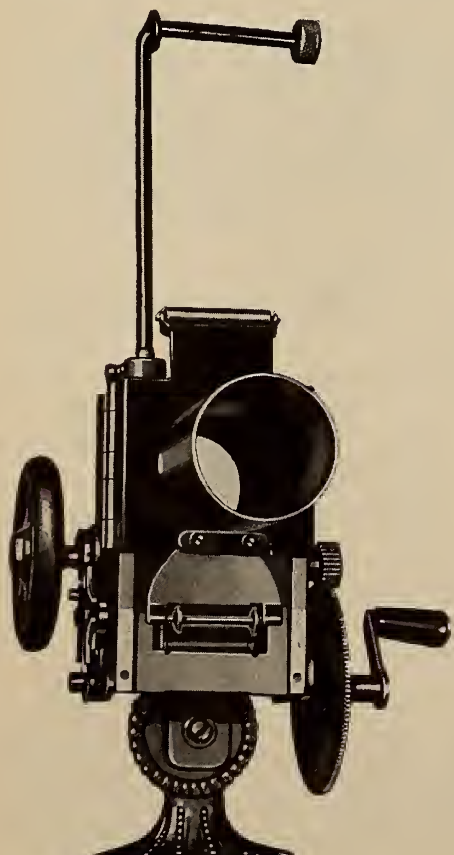
The Model AA went altogether beyond any previous Motiograph unit. The Motiograph engineers did not decide what features it should have—projectionists did. The company asked every projectionist in the country what he would like to see in a motion picture projector. Ideas were also requested from such supply dealers as had had practical projection experience.

"It was really surprising," says President Matthews, "how many excellent ideas we secured from our projectionist friends." A great many of their ideas were incorporated in the final design; and with these inclusions a completely new mechanism was planned.

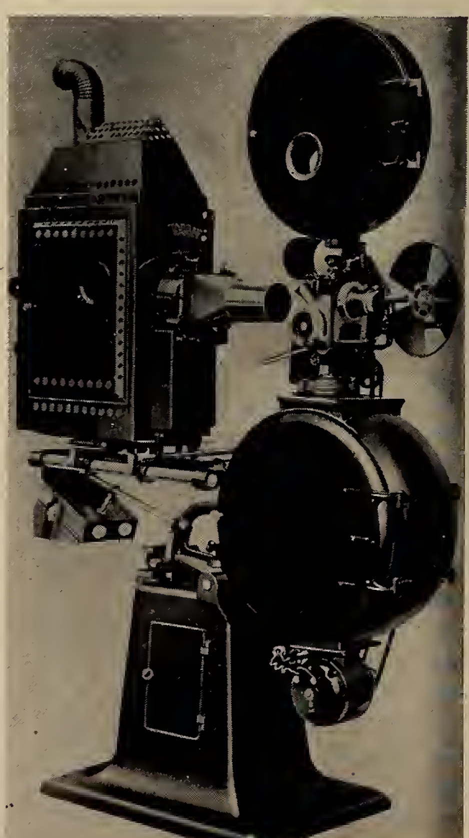
The AA is expected to run for five years or longer without any repair work. It needs lubrication only twice a year. The method of threading film was changed from that used in former Motiograph models to the same general arrangement followed in Simplex and Brenkert-RCA, thus reducing the chance of a mistake on the part of projectionists who handle different mechanisms on different days. The design of the Model AA was not frozen, but has been improved since the first one came off the line. For example, the aperture was so changed that it can be removed while film is running; and the shutter and its gearing were simplified.

RCA's "100"

The RCA "100" mechanism pictured just above on this page is the scion of a



Optigraph, left, 1898, was the first mechonism of the Motiograph line. The orgonizotion then wos known as Enterprise Optical Mfg. Co. Projection light wos obtained from o gasoline lamp. Optigraph wos followed by Model "1A" in 1908, and that in turn by Model "E" (right) in 1916. (Note the position of Model "E" drive motor, under the lower mogozine.) Model "F" came out in 1921. It wos followed by Model "H"—the first sound unit—and thot in turn by Model "HU" in 1935. In 1936 the company chonged its name to Motiogroph ond Model "K" was produced. Todoy's Model "AA" Motiograph, pictured on the page following, embodies oll the experience gornered, lessons leorned, and improvements devised since the days of Optigroph.



Great-great-great grandchild of the Optigraph on the preceding page is this Motiograph AA.

Ultimately descended from the Powers-Simplex wedding is this latest Simplex, the X-L.

long and distinguished line. RCA resources married Brenkert experience, and the "100" is their first-born.

The match was advantageous to both parties, and so ultimately to the theatreman who buys and the projectionist who uses the "100." For with RCA's unlimited resources added to its own experience the Brenkert factory—it is still the identical factory—naturally can turn out a better unit than the very best they could do with their experience alone. And RCA with all its almost endless facilities could turn out a better mechanism with Brenkert experience added than with the same facilities but less experience.

The "100" has automatic lubrication; heavy-duty gearing with wide meshing surfaces—none less than ⅜ inch. All angular driven spiral gears have been eliminated in the 100; there are none. Intermittent star and cam bearing surfaces are oversize, and cooled by a continuous flow of oil that circulates throughout the entire mechanism and not in the intermittent casing only. The intermittent and all other sprockets are hardened and ground; pad rollers are nylon. These and other features are designed to maintain factory-new performance over a longer period of time, giving a better picture over a longer period of time before repairs are needed and between repairs; and to prolong the overall useful life of the mechanism.

Some repairs are unavoidable; for example, sprocket teeth must wear. The Brenkert-RCA design reduces the cost of this inevitable result of friction because the RCA sprockets can be reversed, doubling their life. And they are easily removed from their shafts for this purpose—merely by taking out one screw. The design of the "100" throughout is similarly based on the twin principles of so building the machine that repairs will be needed as little as possible and very easy to make when they become unavoidable.

Operation is facilitated by flood lights for threading, a framing aperture, full-view film path, illuminated gear compartment completely visible through a large window, simplified focusing.

Performance in terms of the image on the screen is naturally related to the large-size gearing and intermittent construction in terms of picture steadiness; in terms of brilliance of image to the four-inch diameter lens barrel and highly efficient rear shutter; in cleanliness of image to the total absence of lubricating oil from the film compartment and to the ease with which gate and lens can be removed for cleaning, and in absence of side sway to the full length film trap.

Says RCA's Jack O'Brien: "If Brengert hadn't been making grand projectors we wouldn't have joined that company; when we did join them it was certainly our business to make the product better still, and we've done it."

Water-Cooled Projectors

Among the most recent developments in projection is the water-cooled aperture. This is so very recent that at the time these words are typed there is only one water-cooled mechanism on the American market; but within six weeks from this time there will be two.

Addition of water cooling to the projection mechanism is a step in the same line, toward the same objective, as many other improvements mentioned above that have been developed through the years; such, for example, as rear shutters to keep the aperture cooler, or shutter fins or other ventilating arrangements provided to lower aperture temperature by means of a moderate air blast. The need for aperture cooling has grown with increasing arc intensities for increasingly brighter screen images on larger and larger screens. Always the limiting factor has been the sensitivity of film to heat. Water-cooled apertures therefore represent one further step toward the universally-sought object of brighter and larger images.

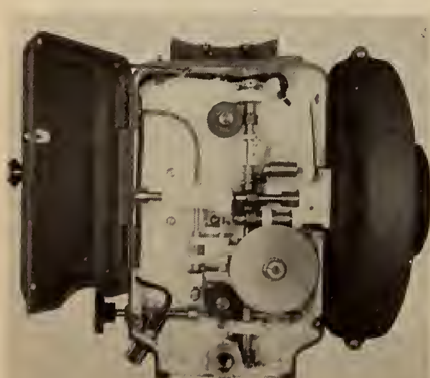
The makers of the Century projector pioneered in the development of the water-cooled aperture, which they introduced commercially three years ago. The 1952 model illustrated here, embodies this feature in addition to a number of other Century innovations.

The Century projector also has a background that reaches far into the earlier days of the industry. One of its remote predecessors was strikingly like the Regular Simplex. This resemblance no longer exists. In 1939 Century projector Corporation brought out a radically simplified mechanism. Its basic principles have been refined through the years that followed. Among them are:

Century's 1952 Model

Sealed-for-life ball bearings to minimize lubrication problems and maintenance; utmost attainable simplicity and minimum parts, again minimizing maintenance; correspondingly roomy compartments on both film and operating sides, for easier operation; self-aligning, adjustable pressure shoes in place of pad rollers on the intermittent sprocket, for better screen image; cushioned gears on shutter and intermittent drives, for longer life, steadier image; longer life, less end play and quieter operation result from

(*Continued on page* 38)



Remote descendant of the Simplex Regular, the 1952 Century features water-cooling.

Also descended from the Simplex Regular, this Ballantyne BW is water-cooled.

The New Ansco Color Film and Process

This considered report finds that the new Ansco color film can be focussed as accurately as black-and-white and spliced as readily, and that it possesses photographic latitude ranging from realistic highlights to the detail inside deep shadows. The film's structure, processing and performance are here reviewed.

By ROBERT A. MITCHELL

A NEW consciousness of the unlimited possibilities of color is making itself felt in the motion-picture industry. Not only are more feature pictures filmed in color than ever before, but newer full-color processes which permit greater photographic freedom, studio color-film processing, and release-print manufacture by regular "black-and-white" laboratories, are very much in evidence.

Among the foremost of these new processes is Ansco color, used for filming and printing MGM's "The Wild North." In this production the full range of tone and color faithfully reproduced the freshness and ruggedness of the Canadian Northwest. The blue of sky and water, and the innumerable tones of green in natural foliage, flashed forth clearly and brilliantly on the screen to give a perfect illusion of reality.

In some color films the deep shadows in a photographed scene are actually a fog of dark red in which all pictorial detail is hopelessly lost. To prevent obliteration of the shadow detail in such films, it is necessary for the producer either to decrease the overall density (which unfortunately transforms the wispy texture of the highlights to a featureless glare) or else to reduce the photographic latitude, making the picture "thin" and "flat."

In "The Wild North" pictorial grandeur is enhanced by a range of light-value contrasts in perfect color balance from the eye-dazzling highlights to the wealth of pictorial detail simultaneously visible in deep shadows. With film of such range of response, exterior color scenes need no longer appear as though photographed at high noon—flat and uninteresting; but producers can capture the flavor of time, locale and atmospheric and seasonal mood in the color medium. Color, that is, becomes a *dramatic* medium, to be treated as such by the more sensitive masters of movie-making.

Of direct importance to the projectionist in his own immediate responsibility is the fact that Ansco color film possesses the same consistently sharp focus as black-and-white; and comparable resolving power—the ability to separate and present small details.

These prints require no special projection technique. Color on the theatre screen is always at its best, however, when the projectionist gives adequate attention to the arc lamps to avoid faulty screen illumination resulting from discolored or uneven light; and, of course, when all projection gear in the light path is kept immaculately clean.

Ansco color prints are made on high-acetyl base of first quality and are, therefore, readily spliced with the same safety cements or double-purpose cements that give satisfactory results on black-and-white high acetyl-prints.

Types of Color Film

There are three main types of color film: (1) those that have color built into the photograph emulsion, and hence are exposed and printed photographically; (2) those that have the images stamped on the film by dye-soaked, relief-image matrix films, and (3) those that utilize chemical dye-toning of black-and-white emulsions, usually coated on both sides of the film-base.

Ansco color, the subject of this article, belongs to the first class. Its camera is an ordinary camera, without color filters or beam-splitting optical system. Only this and other "monopack" films can be exposed in ordinary single-aperture, single-magazine movie cameras, developed on ordinary black-and-white processing machines and printed on ordinary black-and-white printers. This simplicity is possible only when the color has been built into the emulsion during manufacture of the raw stock.

All natural-color photography involves some method of splitting up the vari-colored light of the scene to be photographed into three primary components, thus forming three separate images, or "color records." The light is *analyzed* in the camera into its components; while in the print these components are brought together again to *synthesize* the colors of the scene photographed.

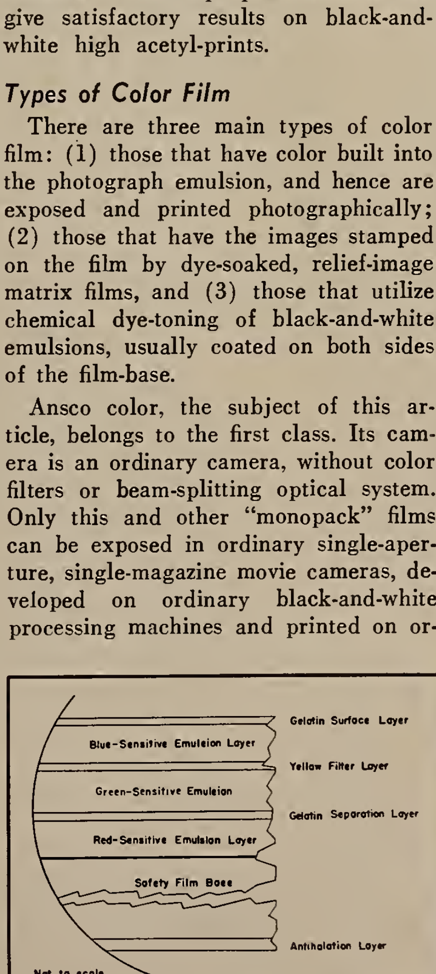
The color-photographic analysis may be accomplished by simultaneously exposing three negatives, each through a separate color-filter, which, of course, requires a special beam-splitting camera having three picture-apertures, three sprocket-trains, *etc.*; or else through a simplified variation that permits two records to be made through a single aperture. In Ansco color, however, the color-analysis is accomplished inside the emulsion of the negative.

Primary and Complementary Colors

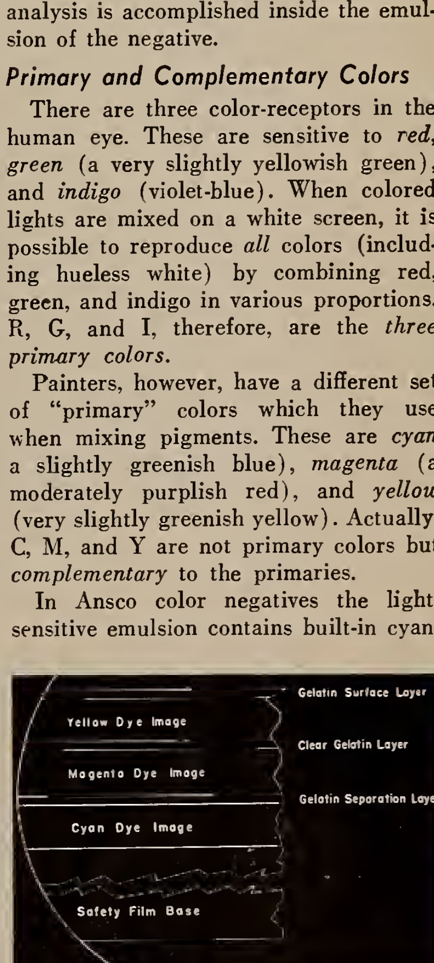
There are three color-receptors in the human eye. These are sensitive to *red*, *green* (a very slightly yellowish green), and *indigo* (violet-blue). When colored lights are mixed on a white screen, it is possible to reproduce *all* colors (including hueless white) by combining red, green, and indigo in various proportions. R, G, and I, therefore, are the *three primary colors.*

Painters, however, have a different set of "primary" colors which they use when mixing pigments. These are *cyan* a slightly greenish blue), *magenta* (a moderately purplish red), and *yellow* (very slightly greenish yellow). Actually, C, M, and Y are not primary colors but *complementary* to the primaries.

In Ansco color negatives the light-sensitive emulsion contains built-in cyan,



Undeveloped Ansco color film, showing the color-sensitive emulsion layers.



Developed Ansco color film, showing emulsion converted to dye images.

magneta and yellow "process colors" sensitized to the same spectral bands, or regions, to which the three color-receptors of the human eye are sensitive. Just why C, M, and Y dyes are used for building up the images on color film, instead of the true primaries R, G, and I, will become clear when the process is examined in detail.

The Photographic Process

To do this, let's forget Ansco and other color processes in commercial use, and invent one of our own. It may not have much practical value; but it will clarify the principle involved in making a natural-color print from the three color records. Suppose three negatives are exposed in a beam-splitting, 3-aperture color camera. These color negatives will develop black-and-white, of course, and all three will look exactly the same except that the densities of all colored objects photographed will be more or less different on each negative. In other words, the color values are "latent" in the three simultaneously exposed negatives.

We then make a black-and-white print from each negative. Now if the black-and-white image on the positive printed from the "red-record" negative is converted—by chemical toning, let's say—to *that color which ABSORBS red light from white light,* the image will then subtract red from all the areas where no red was present in the original scene. The color which is completely red-subtracting happens to be cyan!

Remember—we are not *tinting* our red-record positive all over with cyan; we are only *toning* the photographic image from a black silver image to a cyan image.

The same idea is carried out with the other two positives. The silver image on the film printed from the green-record negative will be toned to a magenta image because magenta absorbs all green. And the image printed from the indigo-record negative will be toned yellow.

We now have three very pretty positives, one with cyan pictures, one with magenta pictures, and one with yellow pictures. But still no natural-color pictures. How can we get them?

Place the three positives one over the other in exact registration and glue them together so they won't slip out of line—that's all we have to do. Each process color (C, M, or Y) will subtract its proper primary color (R, G, or I) from the white light of the projector, and lo! we obtain a picture in perfect natural color. Now three thicknesses of film glued together admittedly might be too bulky for the smoothest projection results; so the best commercial processes superimpose all three colors (C, M, and Y) in one coating of emulsion.

In imbibition-process color films the image is built up in three printings on a single film. In Ansco color films there are three very thin color-sensitive and color-forming emulsions coated on one side of the film-base. The total thickness of the Ansco color multilayer emulsion "pack" is not appreciably greater than that of regular black-and-white emulsion.

The Multi-Layer Emulsion

1. *The Indigo-Sensitive Layer.* The Ansco color multilayer emulsion is surfaced by a thin layer of glossy gelatine which protects the emulsion from accidental scratching. Directly underneath this invisible protective coating is a layer of photo emulsion which is affected only by indigo-violet light, and does not respond to green or red. This emulsion, therefore, constitutes the indigo record.

Below the indigo-sensitive emulsion is a yellow *filter-layer* which screens indigo light from the two emulsions which lie below it. The deep yellow color of this gelatine layer is produced by colloidal silver—dispersed silver grains much smaller than those in a black or gray silver image. Red and green light pass


Love's new sweet song
True love never did run smoothly—
not in the continuity. But in filming
it must . . . if new-day budgets are
to be met. That is why so much attention
is given to keying film and situation . . .
to precision processing controls; why so much
is done to ensure prints of optimum quality at
minimum expenditure; why the Eastman
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practically unimpeded through this filter-layer, since yellow represents white light from which indigo rays have been removed (leaving red and green).

2. *The Green-Sensitive Layer.* Under the filter-layer lies an emulsion which is sensitive to both green and indigo light. Indigo light, however, is prevented from reaching this emulsion by the yellow filter-layer. This emulsion, accordingly, photographs only green light, and is known as the green record.

3. *The Red-Sensitive Layer.* Under the green-recording emulsion there is a special emulsion which is "blind" to green, but photographs red light. This emulsion is, of course, also protected from indigo-blue by the yellow filter layer. It therefore constitutes the red record.

The red-sensitive emulsion is coated on the clear high-acetyl safety-film base. But coated on the non-emulsion side of the base is a dark "antihalation" coating which prevents the light passing through to the back of the film during exposure in camera or printer from being reflected and scattered into the light-sensitive emulsions, spoiling the image with glare-spots and halos. (All camera film, whether color or black-and-white, has an antihalation backing which washes off when the film is developed.)

A "pack" of three microscopically thin emulsions, each sensitive to a different primary spectrum-color, is not enough, by itself, to produce a picture in natural color. If this were all there were to Ansco color film, it would behave exactly like black-and-white film even though latent color values reside in the three sensitive layers. Something more must be put into the film to transform color values into actual color that we can see. Ansco must "tone" the three sensitive layers to their latent color values of cyan, magenta, and yellow. To accomplish this, there are added special chemicals called "color-formers," a yellow color-former being incorporated in the indigo-sensitive emulsion, a magneta color-former in the green, and a cyan color-former in the red-sensitive layer. The color-formers have no color of their own, but they react, during development of the film, with "dye-couplers" in the developing solution to form the desired yellow, magenta, and cyan dyes.

Photography and Processing

Because these dyes are complementary in color to the primaries recorded, the new Ansco color film is called a multi-layer *complementary-color* film. The triple-layer cyan, magenta, and yellow images are entirely equivalent to the three glued-together positives we imagined a few paragraphs back, but thin enough throughout their triple ply for accurate focusing and flexible enough for practical, ordinary projection. And they are characterized by extreme stability of the dye images.

Ansco Color Negative Film Type 843 is exposed in the usual way in any 35-mm motion-picture camera. This camera film is intended for exposure with daylight-quality light-sources, although overall color balance on a movie set is not critical. It is only necessary to have all light sources — low-intensity arcs, high-intensity arcs, and incandescent lamps — balanced to the same color temperature except where special effects are desired. Standard filters used in all interior color filming enable a proper balance to be obtained.

The exposed camera film is developed in the same manner as black-and-white film, the only addition to the process being a bleach bath and a second "fix."

1. *Pre-Bath.* The exposed raw film is first run through an alkaline solution which prepares the antihalation coating on the back of the film for removal. A brief rinse then washes it away, leaving the back of the film clear.

2. *Color Development.* The film passes to the developing tank of the processing machine. The color-developer brings out the silver images in the usual way, but the dye-producing agents in the solution also initiate a "coupling" chemical reaction whereby yellow, magenta, and cyan dyes are formed in close contact with the grains of developed silver, *and nowhere else on the film.*

The fact that the dyes are formed in closest possible contact with the individual silver grains as these are produced during development insures extremely good image-definition. Furthermore, the non-diffusing characteristics of the dyes safeguards this excellent definition.

3. *First Fix.* The film is next treated in an acid "short-stop" bath to arrest the development process, just as in the development of black-and-white stock. Then the film is "fixed" in a "hypo" solution to remove all unreduced silver salts.

At this point the Ansco color negative has the appearance of an ordinary black and white negative, except that it has an overall yellow tint due to the filter-layer of colloidal silver. No color can be seen in the picture images (even though it is there) because the black-and-white silver image conceals the dye image produced during development. The next step, obviously, is the removal of the black-and-white silver image and of the colloidal filter-layer.

4. *Bleach.* This step is a departure

(*Continued on page* 36)

Cinerama in the Public Press

Herewith IP presents excerpts from some of the non-technical comment on Cinerama as published by reporters and movie critics after the recent Broadway opening of the new-process projection system. Readers may care to compare and contrast some of these reports and opinions with those in IP's October issue.

LAST MONTH IP presented its account of the Cinerama process as the screen results would look and sound to the eye and ear of a projectionist. The article stated: ". . . technically unskilled reviewers, reporting the premiere in the New York daily press, though apparently they did not note all the mechanical flaws, did comment on some; they also noted that the presentation offered only spectacular scenes, no dramatic or emotional ones."

A number of these comments of the New York daily press have been assembled by IP and are presented here:

"It was noticeable that last night's program was made up exclusively of purely scenic presentations — pictorial spectacles—without any attempt at storytelling in the customary sense. All of the scenes were in long shots. . . . However, the quality of the color (by Technicolor) was generally excellent and the merging of the three images at the margins was only occasionally perceptible." *N. Y. Times*, Bosley Crowther, Oct. 1.

"Cinerama is the most exciting thing to hit New York since penicillin. . . ." *N. Y. Daily News*, Ed Sullivan, Oct. 2.

"The audience . . . screeched in terror, gasped in awe and applauded with delight and amazement . . . a strong impression of reality and third dimension. . . . The advance in sound reproduction is almost as striking as the change on the screen. . . . Minor flaws on the screen, too, can be forgiven in a first demonstration. There were moments when one section of the picture did not quite match its neighbor. The three sections always were divided by a narrow line of light. Plenty of work still remains for Cinerama's engineers." *N. Y. World-Telegram and Sun*, Alton Cook, Oct. 1.

"As one whose knowledge of electronics is limited to turning switches on and off, I won't attempt to explain the scientific principles involved. . . . The result is a startling illusion of reality. You don't need special glasses; all you do is gasp and feel yourself becoming part of the images that come alive on the gigantic curved screen." *N. Y. Journal American*, Rose Pelswick, Oct. 1.

"In the realm of the documentary travelogue, Cinerama is matchless. The only question is whether travelogues could support such expensive . . . equipment. In fiction . . . the area is so spacious that a new problem is added. . . . There's too much space to handle dramatic focus. . . . Why get this huge area if you want to use it only occasionally? . . . It is probable that the only technical difficulty now visible, imperfect matching and joining of the three sections, will be corrected in time." *N. Y. Post*, Archer Winsten, Oct. 1.

". . . The closest thing to actual experience we have ever witnessed. . . . There is a slight wiggling where the scenes merge on the screen as well as a fading of color at the two points of diffused juncture. These are minor mechanical flaws that will be perfected. Sound . . . is another remarkable achievement. . . . Cinerama is a most remarkable accomplishment. It gives promise of an entire new aspect of entertainment." *N. Y. Daily Mirror*, Frank Quinn, Oct. 2.

"The illusion of reality was incomparably greater than that suggested by the conventional film of today. . . . The conclusion was inescapable that wide-angle film photography and large-screen projection pleased everybody—old and young, male and female, knowing and naive.

"Of course, there are flaws. Since three films are projected simultaneously, the

(*Continued on page* 36)

Correction

The report on the Cinerama process that appeared in IP for October, 1952, stated, in describing the procedure developed by Cinerama engineers, that ". . . the projection rate was 16 frames per second. Despite this reduced rate no flicker was conspicuously evident in the performance. . . ." IP is now informed by friends of Cinerama that the process no longer uses 16 fps and did not do so during the showing reported; that this former rate of projection was abandoned some time ago and the present rate is 26 fps. Cinerama film at present runs 10.66 frames to the foot and is projected at the rate of 146.3 feet per minute.

Friends of Cinerama also advise that the projector jumps referred to in IP's report are not actually in the projectors but are camera jumps, which will be eliminated or reduced in new cameras now under construction.

New Crystal-Optical Recorder

CRYSTAL LIGHT VALVE WITHOUT MOVING PARTS OR MECHANICAL ACTION USES POLARIZED LIGHT PRINCIPLE; MAY RETARD OR REVERSE PRESENT TREND TOWARD OPTICAL RECORDING.

IN THE "WAR" now raging in Hollywood between optical and magnetic soundtracks—a contest in which complete victory for the magnetic faction would result in magnetic instead of photocell reproducers in projection rooms—Paramount Pictures, Inc., has just entered a new strong contender on behalf of optical methods.

At the recent SMPTE convention in Washington, D. C., Paramount's Robert Dressler and Albert A. Chesnes presented a paper (summarized in IP, November 1952, page 23) in which they described a new light valve recorder that has no moving parts. The valve is a crytal assemblage, diagrammed here in Figure 1, wherein no mechanical motion of any kind occurs.

Optically and electrically, the crystal structure is a solid-state equivalent of the Kerr cell used for recording sound-on-film in the very earliest days of talking pictures. The Kerr cell, however, suffered from deterioration of its active liquid owing to electrolysis produced by the current to be recorded. The crystals used by Dressler and Chesnes are described as being completely stable chemically, and immune to deterioration of any kind over periods of many years.

How It Works

Polarized light, as used in stereoprojection, is also the basis of this recorder. A beam of light may be thought of as having a central core or rod, from which center vibrations extend in every direction to the outer edges of the beam and back—vertically to the top and bottom boundaries of the beam, laterally to its side boundaries, and slantwise at all angles from the center to all boundaries of the beam.

A polarizing filter can be thought of as a series of physical slots which, for example, are arranged vertically and, therefore, allow only the vertical vibrations of the light beam to pass through. Also, the slots may be disposed either horizontally or at any slant.

When a polarizing filter is placed in a light beam, that light which succeeds in passing through is said to have been either vertically or horizontally polarized, or polarized at such-and-such angle, depending on the filter. A common polaroid filter can be rotated so as to polarize light to any desired angle.

When two polaroid filters are used, one behind the other, and so rotated that the invisible "slots" in one are vertical while those in the other are horizontal, no light at all gets through—or at least, not more than 3/10ths of 1 percent of the original amount.

When two "crossed" polaroid filters are arranged as just described, and a piece of cellophane introduced between them, some degree of illumination is again transmitted. The cellophane has a re-polarizing or rotating effect on those light vibrations that have passed through the first polafilter and have not yet reached the second; under these circumstances some degree of transmission through the second filter will occur.

The new Paramount recording "valve" uses a pair of crossed polaroid filters; but instead of a strip of cellophane separating them a special crystal is inserted between them, and the current to be recorded is applied to the crystal. The repolarizing effect of the crystal on light that has passed through the first filter but not yet reached the second depends on the intensity of the recording voltage applied. The intensity of recording light transmitted can thus be made to vary in proportion to the intensity of the applied voltage, within a margin of overall system distortion rated at less than 4 percent.

The frequency range can be extended, according to the inventors, from 3 cycles per second (the crystal does not respond to absolute DC) up into the megacycle region. The range actually used, in conformity with the limitations of existing theatre equipment, is the 75-8500 cps band.

The low-end filter could be removed for recordings intended exclusively for those theatre equipments that do not suffer from low-frequency hum and distortion. In fact, the inventors state, the overall response of their recording system can easily be held flat within ¼ db from 30 to 10,000 cps whenever theatre apparatus becomes capable of utilizing such tracks.

Overall light transmission of the system is stated to be 16 percent.

Modulation of the light beam achieved by the recorder is adjustable; 75 percent modulation is used.

Structural Details

The entire recorder optical system is shown in Figure 2, wherein the device designated "laminated crystal structure" is the valve that is pictured in greater detail in Figure 1.

The crystals used may be either potassium dihydrogen phosphate or the

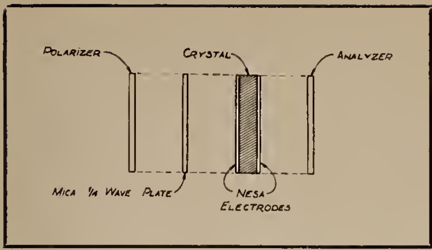


FIG. 1. Recording light valve assembly. Shown at right and left of the diagram above are two polaroid filters, designated "polarizer" and "analyzer." Quarter wave mica plate provides optical bias for crystal action, minimizing distortion. Crystal modulates light beam in proportion to strength of applied AC voltage. Voltage is applied across crystal in same direction as light beam through Neso electrodes, which are transparently thin layers of tin-chloride salt.

very similar ammonium dihydrogen phosphate. When grown in solution they grow in the natural shape shown in Figure 3; the crystals are ground until only the "basal section" of Figure 3 is left (this part is the "crystal" of Figure 1).

The voltage to be recorded must be applied in the same direction as the light beam, not across it. That is, both the voltage, and also the light, are applied to the crystal in the direction of axis Z of Figure 3. The light beam, therefore, traverses the electrodes as well as the crystal, hence the electrodes must be transparent to light.

The "Nesa" electrodes of Figure 1 are used; each is a transparently thin layer of salt—the salt is tin chloride (stannous chloride)— which is deposited on the faces of the crystal as indicated in Figure 1, and to which connecting wires (not shown in the illustrations) are clamped.

The two polaroid filters are located at the opposite ends of Figure 1 and are there designated "polarizer" and "analyzer," respectively. They are simply two polaroid filters set with their invisible "slots" at right angles to each other.

Toward the left of Figure 2 is a rectangle designated "filter." This is *not* one of the polaroid filters. In Figure 2, the polaroid filters are included in the device marked "laminated crystal structure." The one indicated in Figure 2 is a color-filter, chosen according to the emulsion characteristics of the film on which the recording is to be made. Currently, this filter has been selected to pass a bluish tone of light.

In Figure 1 there is a ¼-wave mica plate. Since the blue filter of Figure 2 provides light that is approximately monochrome, or of one wave-length only, an intercepting plate having a thickness of that wave-length or any fraction of it can be inserted. The function of this mica plate is said to correspond to that of the grid bias of a vacuum tube.

The mica plate located between the polarizers acts similarly to the sheet of cellophane referred to earlier. It so operates on the polarized light beam that a certain small amount of light gets through to the soundtrack even when

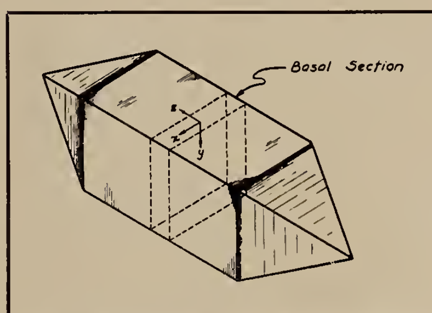


FIG. 3. This diagram shows the original crystal shape and useful section obtained by grinding; the section indicated here by dotted lines is identical with shaded rectangle of Figure 1.

there is no signal. This is the "bias" quantity of light. The AC signal to be recorded represents a plus or minus change of intensity above or below this steady bias intensity. The effect is to eliminate the distortion that would occur if the soundtrack were allowed to go completely dark.

Electrical arrangements for the sound to be applied to this recording valve are conventional except in one detail. The recording amplifier is a high-quality unit with a rated output of 50 watts; this being in the order of a million times more power than is needed, the amplifier assuredly will never overload at any volume level. Owing to the fact that the crystal recording valve is a voltage- and not current-operated device, the amplifier output transformer is wound to deliver a high instead of low voltage output; a signal potential at approximately 2,000 volts.

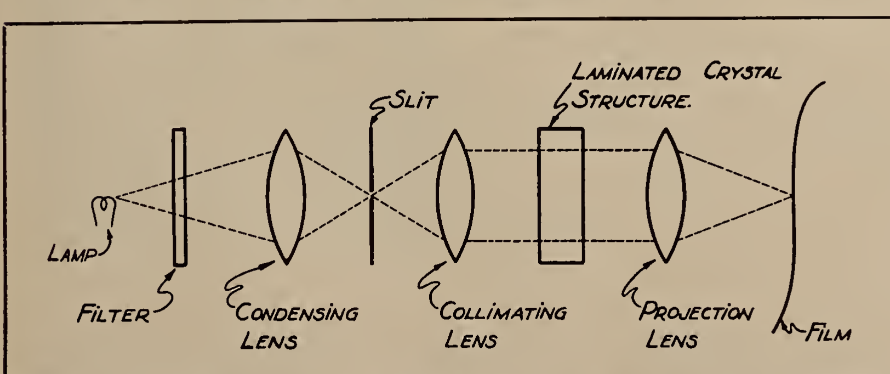


FIG. 2. Pola-crystal recording system. Rectangle designated "laminated crystal structure" is identical with Figure 1. "Filter" shown toward left of this optical assembly is color-filter admitting approximately monochrome bluish light of color-tone suited to the recording emulsion.

Travel Films Preferred

Travel subjects are preferred by the contemporary American public in non-theatrical films, with documentaries second, music third, modern living fourth, and industry and industrial processes fifth. This is the conclusion drawn by E. J. Spiro, Director for the Institute of Visual Training, distributors of business films, from survey replies sent him by 69 Tv stations.

The subsidiary conclusion drawn from the survey was that "the American public today has a sober 'solid citizen' philosophy; that the people are interested in broadening their knowledge, in understanding more about the historical and economic forces that may influence their welfare, and in improvements in their standards of living.

Kollmorgen Has New Address

Kollmorgen Optical Corporation's new address in New York City is 30 Church Street, New York 7, where they will maintain a sales office in charge of J. A. Fetherston, sales manager. The Brooklyn manufacturing plant and offices of the company were closed on December 1st, and all manufacturing has been shifted to the plant at Northampton, Mass.

In addition to "Snaplite" projection lenses and other civilian items, Kollmorgen produces precision optical goods for Naval use and transfer of their factory out of the New York area is in accord with the government's policy of decentralizing industry.

RCA Distributes Prestoseal

Prestoseal film splicer (IP for June, page 30) will now be distributed by RCA domestically and abroad. The equipment joins all types of safety and magnetic film with a butt-weld end-to-end splice that has no overlap, accomplishing this by a plasticizing and heat-welding process. Distribution will be directed primarily to studios since the present price of the splicer puts it beyond the reach of most theatres. Models are currently available for 35-mm, 17½-mm and 16-mm films.

IN THE SPOTLIGHT

WE'RE ALL in show business, and one of the outstanding characteristics of the industry is that it toots its own horn, long and loud. It has to. A theatre that is modest about the attractions it offers would not remain open very long. Then is there any reason why the IATSE should hesitate to follow what is the universal practice of the industry and on occasion call attention to its own value and helpfulness?

Elsewhere in this issue is an account of what the IA is currently doing toward repeal of the 20 percent Federal admission tax, and it isn't trival. IA officials are going direct to members of Congress and acquainting them with the straight facts of life about show business. But read the story for yourself.

Is there any good reason why you—personally—should not follow the universal practice of the industry and show that story to the manager or owner of your theatre? The theatre sings its own praises. Why shouldn't the IA whenever—as in this particular instance—it has something to sing about?

And furthermore, is there any good reason why you should not write to your own Congressman or your local newspaper, pointing out that the theatre industry, which lives by selling entertainment, is now confronted with a competitor who gives away entertainment for nothing; that this condition did not exist when the tax was put into the law; and now that it does exist the tax is too heavy a burden and must be repealed?

Just ask any of your neighborhood merchants how they would like to buck a competitor who gives comparable merchandise away free and, in addition, be saddled with a 20% tax which the competitor does not have to pay!

The argument for repeal of the tax is really unanswerable, and IA men throughout the country can help the International Alliance and the other spokesmen for this industry to spread it effectively. It is a fact, of course, that this tax is a life and death matter to some thousands of theatres throughout the country and therefore affects directly and vitally the security of thousands of projectionists. IA cooperation in helping secure its repeal is no altruistic gesture but merely enlightened self-interest. In this as in so many other matters, industry and labor are literally partners who must prosper or suffer together.

• We were glad to learn that Sam Grieco, secretary of Local 337, Utica, N. Y., has completely recovered from the automobile accident he suffered last summer. It seems that Mrs. Grieco, who was at the wheel, sneezed, and lost control of the car, running it into a tree. Sam Grieco was knocked through the windshield and was hospitalized for quite a while; his wife escaped injury. Did we hear someone say something about "these women drivers?"

• The stalemate in negotiations between IA Local H.63, New York City, and Pathe Laboratories ended several weeks ago when Pathe agreed to a 10% increase in wages plus additional severance pay for its white-color workers. At the request of President Walsh, Joseph Basson, IA representative, sat in on the negotiations.

• The New York Metropolitan Opera House telecast the complete production of the opera "Carmen" on December 11. Heretofore many stumbling blocks prevented the presentation of big-screen theatre TV on a regular weekly basis, particularly the opposition of various crafts and talent unions. However, the fact that the December 11 performance was a benefit for the Metropolitan Opera Fund may have influenced the labor unions involved — IATSE, Musicians Union, and the American Guild of Musical Artists—to cooperate with Theatre Network TV in the venture. The success of this telecast will determine whether or not big-screen TV will become a regular weekly event.

• Floyd Lewis, member of Local 376, Syracuse, N. Y., was presented with a gold life membership card in the Local at the dinner party that followed the recent meeting of the New York State Association of Motion Picture Projectionists. L. Boyd, president of 376, made the presentation.

• Harry Mackler, old-line member of New York 306, is the very proud father of the Dr. Saul Mackler, of Chicago, who received nation-wide acclaim for a delicate operation he recently performed in a Chicago hospital.

S-O-S: If your Local has any record of a member having contracted silicosis or berylcosis as a result of breathing carbon dust or gases, Frank W. Costello, secretary-treasurer of Local 162, San Francisco, would appreciate full details. Local 162 is attempting to collect compensation for a member who has been hospitalized; but under California state laws it is necessary to prove direct connection between the disease and occupational conditions.

• We received a note from one of our foreign projectionist readers who would like to enter an exchange of correspondence with a brother craftsman in this country. He is very much interested in all aspects of the profession and believes that an exchange of ideas between himself and an American correspondent

would prove of mutual benefit. He is: Peter John Ashley, 146 Ampthill Road, Bedford, Beds., England.

• The building housing the headquarters of Local 233, Buffalo, N. Y. is now free and clear of all financial encumbrances. The Local recently celebrated the burning of the mortgage. Our congratulations to the membership.

• A record attendance marked the 1952 Fall convention of the New York State Association of Motion Picture Projectionists. The meeting was held in Syracuse, with Local 376 acting as host to the delegates and guests. A considerable portion of the session was devoted to a lively discussion of wages and working conditions of the craft. An exchange of views on many industrial problems; a demonstration of obsolete projector heads by Wm. F. Robacker, delegate from Local 311, Middleton; and a talk on Cinerama, given by M. Rondum, designer of the camera used in this new film process, highlighted the meeting.

Also, a resolution commemorating the death of Harry Sherman, former conductor of these columns, was read to the gathering and was incorporated into the minutes of the Association.

• Joining the ever-increasing number of IA Locals that have become acutely welfare-minded, Local 650, Westchester County, N. Y., signed a contract last month with the U. S. Life Insurance Company of New York covering sickness and accident insurance for its entire membership. Under this plan, benefit payments of $35 per week start the first day of accident and the eighth day of sickness; the payments to run no more than 52 consecutive weeks.

• A strike on the West Coast was averted when Fox West Coast Theatres concluded a new pact with San Francisco Local 162. Among other benefits, the new contract provides for the health and welfare plan, details of which appeared in IP for September, 1952. Local 162 contracts with other theatre circuits, signed several week ago, also include similar benefits.

• Clyde Cooley, secretary of Local 343, Omaha, Nebr., was elected secretary of the Nebraska State Association, a post he held several years ago.

• The amusement industry is now in the midst of its annual fund-raising campaign for the Will Rogers Memorial Hospital. It is confidently expected that this year's goal of $200,000 will be reached, and possibly passed. At the recent convention in Minneapolis, IA President Walsh, who is a vice-president of the hospital, urged the continuation of the "excellent financial support which members of the Alliance have given this institution." IA Locals contributed $16,000 to last year's campaign, and it is hoped that this sum will be exceeded this year.

• A walkout of IA employes in the Corwin chain of theatres in Los Angeles was averted last month when the Corwin circuit agreed to the demands of Local 150 for retroactive pay due the projectionists who worked at the Rialto Theatre during the showing of the first-run picture "A Street Car Named Desire." It was the contention of the Local officials that road-scale wages and conditions apply to all first-run pictures, regardless of the type of theatre in which they are

Joseph A. Schappach, financial secretary-treasurer of Local 650, is shown here signing the group welfare contract with the U. S. Insurance Company. Schappach is flanked on either side by Mort E. Schaff and Robert W. Staton, representatives of the insurance company. Looking on approvingly are (standing, rear): Albert Storch and Fred Thome, vice-president and business manager of the Local.

IA Joins Fight for 20% Admissions Tax Repeal

IA President Richard F. Walsh's pledge, at the recent Minneapolis Convention, that labor will stand with management in the industry's fight for repeal of the amusement tax has already begun to produce results in independent actions by IA Local Union officials.

In Pittsburgh, Penna., Harry Hendel, coordinating chairman of the exhibitor committee conducting the fight against the tax, called on James V. Stipe, business representative of Local 171, for cooperation, and got it in abundance.

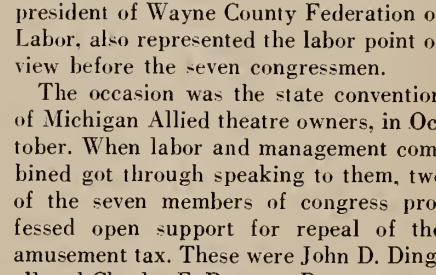
Sipe arranged a luncheon meeting between industry groups and Congressman Herman Eberharter, who is also a member of the all-powerful House Ways and Means Committee. The meeting was conducted in the card room of Variety Club Tent No. 1 in Pittsburgh. Theatre management was represented by Mr. Hendel, Mo Silver of Warner Brothers, and by a number of independent theatre owners. Labor was represented by Sipe; Hal Davis, president of the musicians' Local; and Charles Levy, international representative of the Building Service Employees union. Between them, they gave the congressman the facts of life anent the theatre industry.

They impressed upon him all the arguments prepared by COMPO and those presented in IP and in other trade publications: in addition, they pointed out (what is too often overlooked) that an excise tax is unfair in the case of an industry such as this, which sells only an intangible—time—and not a commodity that can be shelved and sold tomorrow if business is slow today. Congressman Eberharter suggested that the motion picture industry send representatives to repeat those arguments before the full Ways and Means Committee when it holds hearings on the amusement tax in Washington.

In Detroit no less than seven congressmen were present at an industry gathering also attended by three IA officers—E. Clyde Adler, president of the Michigan District; Frank Kinsora, president of Local 199; and Clarence Purdy, president of Local 395. Frank X. Martel, president of Wayne County Federation of Labor, also represented the labor point of view before the seven congressmen.

The occasion was the state convention of Michigan Allied theatre owners, in October. When labor and management combined got through speaking to them, two of the seven members of congress professed open support for repeal of the amusement tax. These were John D. Dingell and Charles E. Potter, a Democrat and a Republican, respectively. The other congressmen, impressed if not yet convinced, were George Dondero, John Lesinski, Thad Machrowicz, George Meader, and Louis Rabaut, also of both parties.

And down in New Orleans, Gaston Dureau, state campaign chairman for the Council of the Motion Picture Organizations, has asked the cooperation of local labor in COMPO's campaign for tax repeal. Dureau plans motion picture labor-management conferences with Louisiana's representatives and senators.



Front and back tab of match booklets distributed by Local 400, Alexandria, La., in the industry's drive to promote greater attendance at motion picture theatres.

shown. The management of the Rialto Theatre, a Corwin second-run house, contested this claim and refused to pay the higher wages. The agreement with the theatre circuit was reached several hours before the threatened walkout.

• An impasse seems to have been reached in the negotiations between New York Local 306 and the N. Y. metropolitan area theatre circuits. Conferences between Local officials and exhibitors have been held since shortly after Labor Day in an effort to negotiate satisfactory contracts to replace the ones that expired September 1, but at the time of writing, both sides are deadlocked.

• Utica Local 337 (N. Y.) recently concluded negotiations with the Kollet, Inc. circuit. The new 3-year contract, retroactive to January 1, 1952, calls for a 3% increase the first year, an additional 2% the second year, and another 2% raise the third year. Other benefits include vacations with pay, and time and one-half for overtime. Representing the Local in the negotiations were: Harry Lackey, John Stuczko, Ken Terrel, and Harold Terrill.

25-30 Club Notes

• Election of officers for 1953 will be held at the next meeting. A report and listing of the new officers will be published in our January issue. . . . Dr. DeForest was voted an honorary membership card in the Club. . . . As might be expected, Cinerama was the chief topic of conversation at the November meeting. Reference was repeatedly made to the detailed and comprehensive article on the Cinerama process that appeared in IP for October, 1952 (page 10).

The January meeting of the Club promises to be of particular interest to the many friends of the late Harry Sherman. This meeting, at which the newly elected officers will be obligated, will also witness the presentation to a member of the family of a beautifully inscribed set of resolutions drawn up in memory of Harry Sherman. IA President Richard F. Walsh has accepted the Club's invitation to make the presentation.

IP LETTERS TO THE EDITOR

To the Editor of IP:

Hurray for Mr. Raymond Peque of Lodi, New Jersey!* There's a man after my own heart. Your records could perhaps show that I wrote a similar article some years ago.

Like Mr. Peque, I simply cannot see touching the image on the film. Whoever gets the prints after I use them, I hereby pledge shall get them at least in the same condition I received them. That is, with the possible exception of putting a grease pencil mark on ONE frame as a cue. But this wipes off very gently with thumb or cloth and there you have the print again just as it was. However, it is hardly ever necessary, since I am fortunate in having the pleasure of working at the "Terrace" and have no trouble seeing the studio clues.

But that letter from Mr. Peque was certainly a dandy. Let's have more of them. We could stand some improvements, here and there. And in addition, I'll make a prediction. Men like him will never need to worry about a job, nor about selling his services. They'll sell themselves very efficiently. More power to you, Ray.

Al Kuiper
3143 *Alabama Avenue*
Minneapolis 16, *Minn.*

* IP for November, page 18.

To the Editor of IP:

Your articles on safety base film were quite interesting and informative. You asked for field experience with the product and so here are my own observations.

My main criticism of the film deals with its lack of resistance to scratching and damage. Try scraping both nitrate and safety film and *feel* the difference. To *see* the difference, look at any print that has been run any length of time and notice the longitudinal *black* (film base) scratches. While we are fortunate in that we usually get fairly new prints, the scratches are there now more often than not.

Then the film is more susceptible to tearing so that leaders are quickly mauled. Damage to the sprocket holes and film edges is much more frequent. I have seen long lengths of fairly new film damaged in this way so as to be beyond repair—and cutting out of the length would destroy the continuity of the picture.

I have noted a greater tendency to accordion, although the bends can be easily straightened out without cracking.

Focus drift is a definite problem in my theater. We have out-dated lenses of short focal length and a large screen. The result is a limited depth of focus. I find myself adjusting and readjusting the focus more than ever before.

Splicing is no problem. With the proper cement and a bit more care, splices are as good as nitrate. The original all-purpose cements were valueless, but they have been considrably improved.

All-in-all the mental relief of not having potential disaster constantly present compensates for the other troubles experienced. We can now devote ourselves to our duties with a more relaxed attitude, with the result that a better job can be done. Undoubtedly the film manufacturers are continuing their research and will in time produce a more perfect product.

Alfred E. Revzin
New York 68, N. Y.

To the Editor of IP:

I would like to take this time to show my sincere appreciation and gratitude towards an excellent publication, "International Projectionist," a monthly technical magazine offered to anyone interested in sound motion picture reproduction.

I have been a reader of same for the last nine years. Since then I have eagerly awaited each new issue. From your magazine I have found the addresses of certain technical publishing companies, and from these I purchased books and literature. In general, I consider myself lucky to be a subscriber and will continue to be such.

Wm. Collins
Marquette, Michigan

To the Editor of IP:

The writer has been reading with interest Robert A. Mitchell's dope on film

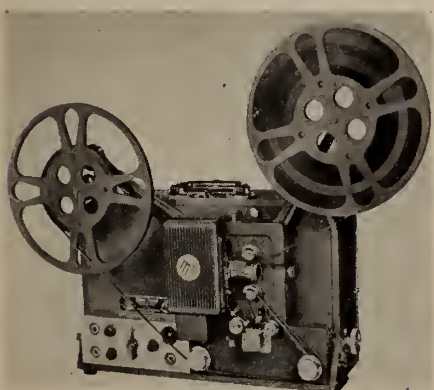
(*Continued on page* 29)

16-mm

BECAUSE EXPANSION OF 16-mm ACTIVITY PROVIDES INCREASING FIELDS OF EMPLOYMENT FOR SKILLED PROFESSIONAL PROJECTIONISTS IN TV STUDIO AND NON-THEATRICAL SHOWINGS, AS WELL AS ENHANCED POSSIBILITIES OF PERSONAL BUSINESS VENTURES. THIS 16-mm DEPARTMENT OF IP WILL APPEAR MONTHLY.

8-mm Movie-Mite Magnetic Sound Projector

Small audiences can often be served satisfactorily with equipment of even narrower gauge than 16-mm. This is particularly true when the service is to consist of making and projecting motion pictures of local events or local notables. To date 8-mm rental sound films are not widely available because until rather recently there has been no equipment on which to run them. They can be expected to multiply now; in addition, existing 8-mm silent films can readily be striped magnetically, and any desired sound then recorded in advance of projection, by means of the recording features of the projector-recorder.



The Movie-Mite here pictured weighs less than 35 pounds. It is equipped with reels taking up to 1600 feet of 8-mm film, enough for any show. It has two speeds, one of which is the standard 24-frame sound speed; a 750-watt projection lamp; microphone and phonograph input jacks which can be used simultaneously to record voice and background music together; built-in tilt adjustment; record and erase heads; volume indicator for guidance during recording; headphone monitor jack for further guidance in recording, and recording and playback volume controls among other features.

An external loudspeaker can be added; and external mixer also can be added to permit recording from more than two sources simultaneously. The equipment can be used as a public address system.

If the film is photographed locally, instructions can be given to have the magnetic soundtrack added at the same time film is processed. When the developed film is returned sound is dubbed in as desired. The magnetic track is locatcd outside the sprocket holes—between them and the edge of the film. Its width is 25/1000ths inch.

Magnetic soundtrack is added to 8-mm film by Reeves Soundcraft of New York at 3½ cents per foot. Cost of the Movie-Mite is $398.50 complete with 6-inch speaker and recording microphone. Manufacturer is Movie-Mite Corporation, 1116 Truman Road, Kansas City, Missouri.

Bengal Plans New Series

Bengal Pictures plans a new series of 16-mm films on strange facts about peoples, animals, birds and fish, strange cults and various religions, according to Phil Cantonwine, head of the organization. Bengal's present releases, *Tales of the Old West* (true incidents of Western history) and *Know Your Land* (American anthropology) are currently being distributed for Tv use through Delira Corporation, and will subsequently be made available for general 16-mm showings.

A strong believer in motion pictures for both the instruction and the entertainment of the armed forces, President-elect Eisenhower is here seen greeting William C. DeVry, president of the DeVry Corporation, manufacturers of 35-mm and 16-mm sound projectors. Others in the picture are, left to right, T. J. Lafeber, general manager of DeForest's Training, Inc., and E. B. DeVry, vice president of the DeVry organization.

Local Sources of 16-mm Films

A DETAILED directory of local libraries that rent or lend 16-mm films is reprinted here from U. S. Government listings. Only those libraries that are, or are likely to be, useful to projectionists have been included; therefore the reader who consults this list will not be wasting his time in applying to sources that cannot serve him.

Booking of 16-mm, like 35-mm, films, is often arranged through local or nearby sources rather than through the producer directly. In the case of 16-mm these are not called film exchanges, but film libraries.

Not all local film libraries can serve the projectionist. Many—they have been carefully pruned out of the listings that follow—are owned by a public school system or group of neighboring school systems, and limited to serving those schools only.

Conditions and Restrictions

Various other restrictions to the circulation of 16-mm prints also exist, based on trade agreements, contracts, business, or institutional policy. But wherever it appeared that some film library included in the government listing might be of service to projectionists the name of that library and the restrictions (if any) under which it functions were included in the listing below. Among these are libraries that cater to civic groups although not to the general public, since the projectionist may be a member of such a group, or else act as agent for it. (Incidentally, an IA union local should most certainly classify as a civic group, since a local Chamber of Commerce does.)

Terms on which films are offered, whether free, on rent, on lease or on sale, must be determined by local inquiry in each case and will vary not only from one library to another but also according to the particular film desired.

Many of the libraries here listed offer non-theatrical 35-mm film in addition to 16-mm prints. This also is a matter into which the interested projectionist must make his own local inquiries from the organizations cited.

The complete list is far too long to be printed in its entirety in a single issue of IP. It will appear serially arranged by states in their alphabetical order during the next few issues to come.

ALABAMA

AUBURN

Alabama Polytechnic Institute
Agricultural Extension Service

Approximately 150 films—informational on agricultural subjects, some sponsored films; distribution restricted to Alabama.

BESSEMER

Bessemer Public Schools
Audio-Visual Aids Department
High School Library

Approximately 50 films—primarily classroom, several entertainment shorts; distribution restricted to Bessemer public schools and civic groups.

BIRMINGHAM

Baptist Book Store

Approximately 200 films—primarily religious; distribution restricted to Alabama.

Brady Movie Services

Approximately 175 films—entertainment and religious.

Evans Motion Picture Co.

Approximately 200 films—entertainment, educational, religious, and sponsored; distribution restricted to Alabama.

Jefferson County Schools
Department of Audio-Visual Instruction

Approximately 275 films—educational, some sponsored; distribution restricted to Jefferson County.

National Conference of Christians and Jews

Approximately 15 films—on racial and religious understanding; distribution restricted to geographical region.

Wilfred Naylor Co.
Visual Education Service

Approximately 600 films—entertainment, educational, religious, and sponsored.

Stevens Pictures, Inc.

Approximately 600 films—primarily entertainment, some educational.

U. S. Department of the Interior
Bureau of Mines

Approximately 25 films—on mining and metallurgical industries.

U. S. Department of the Treasury
State Director, Defense Bonds Division

Three films—about the United States and the Korean situation; distribution restricted to Alabama.

U. S. Marine Corps
District Headquarters
Recruiting Station

Approximately 20 films—about the Marine Corps; distribution restricted to geographical region.

United States Steel
Film Distribution Center
Tennessee Coal, Iron and Railroad Co.

Eight films—primarily on the manufacture and uses of steel; distribution restricted to geographical region.

MOBILE

U. S. Department of the Air Force
Brookley Air Force Base
Public Information Officer

Approximately 40 films — informational about the Air Force; distribution restricted to Southern States.

MONTGOMERY

Alabama Photo Supply Center

Approximately 150 films—entertainment and religious.

Alabama State Dept. of Public Health
Division of Public Health Education

Approximately 170 films—primarily on health and communicable diseases, some entertainment shorts; distribution only to Alabama County Health Departments which lend the films for public use.

John R. Moffitt Co., Inc.

Approximately 100 films—primarily religious, some entertainment, a few sponsored.

Photo and Sound Co.
Audio-Visual Aids and Service

Approximately 100 films—entertainment, educational, religious, and sponsored.

UNIVERSITY

University of Alabama Extension Division
Audio-Visual Aids

Approximately 1,500 films—educational, a few sponsored.

ALASKA

ANCHORAGE

Kohli Motion Picture Service

Approximately 250 films—entertainment, educational, and religious.

Pictures, Inc.

Approximately 225 films—entertainment shorts and features; distribution restricted to Alaska.

U. S. Department of Commerce
Civil Aeronautics Administration

Approximately 400 films—on aviation education and training; distribution restricted to Alaska.

JUNEAU

Alaska Department of Health

Approximately 225 films—educational on health subjects; distribution restricted to Alaska.

U. S. Coast Guard
Commander, 17th Coast Guard District

Approximately 20 films—on the Coast Guard and its activities; distribution restricted to Seventeenth Coast Guard District.

U. S. Forest Service, Regional Forester

Approximately 40 films—on the National Forests, forest management, and forest fire prevention; distribution restricted to Alaska.

ARIZONA

PHOENIX

Baptist Book Store

Approximately 200 films—primarily religious; distribution restricted to Arizona.

Kelton Audio Equipment Co.

Approximately 500 films—entertainment, educational, religious, and sponsored; distribution restricted to Arizona.

Movie Center

Approximately 700 films—entertainment, educational, and religious; distribution restricted to Arizona.

National Conference of Christians and Jews

Approximately 15 films—on racial and religious understanding; distribution restricted to geographical region.

U. S. Department of the Treasury
State Director, Defense Bonds Division

Three films—about the United States and the Korean situation; distribution restricted to Arizona.

TUCSON

National Conference of Christians and Jews

Approximately 15 films—on racial and religious understanding; distribution restricted to geographical region.

University of Arizona
Visual Aids Bureau

Approximately 1,000 films—educational, some sponsored films.

ARKANSAS

CONWAY

Arkansas State Teachers College

Approximately 1,000 films—entertainment, educational, religious, and sponsored.

LITTLE ROCK

Arkansas State Board of Health
Division of Public Health Education

Approximately 400 films—educational and sponsored; distribution restricted to Arkansas.

Baptist Book Store

Approximately 200 films—primarily religious; distribution restricted to Arkansas.

Democratic Printing & Lithographing Co.

Approximately 180 films—entertainment, educational, and religious.

Grimm-Williams Co.

Approximately 200 films—entertainment, educational, religious, and sponsored.

Little Rock Public Schools

Approximately 200 films—all educational, a few sponsored; distribution restricted to Little Rock public schools and closely related organizations.

Rent-A-Movie Corp.

Approximately 450 films—entertainment, educational, and religious.

U. S. Department of the Treasury
State Director, Defense Bonds Division

Three films—about the United States and the Korean situation; distribution restricted to Arkansas.

U. S. Marine Corps
District Headquarters
Recruiting Station

Approximately 20 films—about the Marine Corps; distribution restricted to geographical region.

NORTH LITTLE ROCK

North Little Rock Public Schools

Approximately 275 films—classroom, a few sponsored; distribution restricted to North Little Rock public schools and community organizations.

SEARCY

Harding College
Motion Picture Division

Three films—educational and informational.

[TO BE CONTINUED]

TESMA-TEDA Exhibit Huge Success

LARGEST and by far the most successful TESMA-TEDA trade show ever held was the undisputed verdict of all who attended the 1952 exposition of theatre equipment in Chicago on November 15th-19th.

On this occasion, the Allied States Association of Motion Picture Exhibitors joined with the Theatre Equipment and Supply Manufacturers Association and the Theatre Equipment Dealers Association in the united convention and exhibit; in 1953, Theatre Owners of America will also participate, making the occasion a foursome.

Outstanding among its events was the presentation of an honorary plaque to Harry M. Strong, one of the six charter members of TESMA and president of the Strong Electric Corporation, makers of projection arc lamps and rectifiers.

"The Theatre Equipment and Supply Manufacturers Association Citation of Merit," the honorary plaque reads, "presented to Harry M. Strong, president, Strong Electric Corp., in recognition of his leadership and as an expression of the devotion and respect with which he is held by the entire industry. He is one of the six charter members which founded TESMA in 1933. In 1945 when TESMA was reorganized it was his farsightedness, personal-financial support and faith that made possible the first trade show at Toledo, Ohio. For his spirit and wisdom, vital in the molding of an organization, we are greatly indebted."

Larry Davee, sales manager of Century Projector Corp., was re-elected to membership in the TESMA board of directors; and Tom LaVezzi of LaVezzi Machine Works, and Donald Hyndman, of Eastman Kodak, were also elected. TESMA adopted a new trade mark insignia embodying the TESMA slogan: "That the show may go on."

Equipment Items Displayed

Among many entertainment features of the gathering one of the most memorable was that staged by Ray G. Colvin, TEDA executive director, at Chicago's Ivanhoe cafe, where former heavyweight champion Jack Dempsey officiated as master of ceremonies.

Many projection screens were represented among the displays. RCA presented the Synchro-screen; Raytone presented a number of models plus screen paint for drive-ins; B. F. Shearer Co. showed the Starke cycloramic; Vocalite showed their Super-Lite and crystal beaded screens, and Walker Screen was represented at National Theatre Supply's exhibit.

In projectors RCA showed the 100 model; National Theatre Supply ex-

Harry H. Strong receiving honorary plaque from TESMA president Bob Hoff. Left to right: Lee Jones of Neumade Products, Hoff, Strong, and Roy Boomer, TESMA secretary-treasurer.

hibited the Simplex X-L; DeVry showed the "12000" combination projector and soundhead unit; Wenzel, Ballantyne, and Century had exhibits. The Motiograph booth, however, displayed only Trad lobby-size television, none of the many Motiograph projection room products being physically on exhibition this year. De Vry and RCA also displayed 16-mm projectors.

Lamps and Speakers

Norpat Sales unveiled their "continuous carbon burner" for Ashcraft, Brenkert, Peerless, Simplex and Strong lamps.

Peerless (J. E. McAuley Mfg. Co.) exhibited a new line of Magnarc arclamps that will be described and pictured in detail in an early issue of IP. Drive-in speakers were shown by Dawo Corp., by Diecast Aluminum Speakers, Inc., by Oxford Electric Corporation, Erpad, RCA, National Theatre Supply, and others.

Superior Electric Co. displayed dimmers, and rheostats by means of which a theatre can build its own dimmers. Dit-Mco Corp. showed projection port blowers for drive-ins, designed to protect the projection lens against insects, in-car speakers, underground cable and other items of drive-in equipment. Ballantyne showed a model of the Boyer "Ex-Erect" prefabricated drive-in screen tower, and other drive-in equipment.

Hal I. Huff Manufacturing Co. demonstrated the Huff positive carbon cooler. Neumade Products showed 35-mm and 16-mm rewinds, 8-, 16- and 35-mm and film cabinets; Wenzel showed a 35-mm motor-driven and 35- and 16-mm hand rewinds; GoldE Mfg. Co. exhibited rewinds and baby spots.

National Carbon Co. had one of the largest booths, both for projection carbons and for usher flashlights and flashlight batteries. Lorraine carbons were exhibited. Robin motor-generators, Gordos and Continental rectifier tubes were also represented.

Ashcraft Superhigh arclamps were demonstrated and Strong Electric had a large display of projection and spotlight arc lamps. Bausch & Lomb, Kollmorgen and Projection Optics showed projection lenses. LaVezzi Machine Works attracted many visitors with their attractively-machined projector parts.

Projectionists Urged to Come in '53

Plans for next year's TESMA-TEDA-ALLIED-TOA combined conventions and equipment exhibit will require an even larger gathering place than Chicago's skyscraper Morrison Hotel, which was the locale of this year's get-together. In 1953 the scene will be the self-proclaimed "largest hotel in the world," Chicago's Hilton, formerly called the Stevens.

Roy Boomer, TESMA's secretary-treasurer, has special plans for making the 1953 exposition exceptionally attractive to projectionists and making projectionists particularly welcome. He will disclose those plans via IP in the months ahead. Since every item of equipment used in the projection room is expected to be on display, including almost every make and every model of each item, the 1953 show will offer projectionists a unique opportunity to extend their background and knowledge of the available tools of the craft, Boomer argues. It is his contention that projectionists in general are best acquainted with the equipment installed in their own theatres, but are not equally familiar with other varieties. However, at a TESMA exhibition they can see and study all.

Synchro-Screen for Large Theatres

LARGE theatres can now have the light-surrounded RCA Synchro-Screen. The large-theatre model was demonstrated in New York early in December in the 3,100-seat RKO 58th Street Theatre. There are now four versions or sizes of this screen, for theatres of every size. Models for small theatres were made available early this year; and the entire idea of the light-surrounded screen was debated in IP for January and March of this year.

The Synchro-Screen has wings, surfaced with the same material as the screen itself, which surround the projected image on three sides and constitute in appearance an ever-changing frame for the picture—a frame that varies in general brightness and color of illumination synchronously wtih changes in the picture itself. No mechanical means or accesories are used to produce this effect; it results from natural spillage of light from the screen surface to wings set at appropriate angles.

The immediate effect is to make the picture seem larger. Further, the contrast between a bright picture and black masking is eliminated. This results in a more natural presentation, since very few events in real life take place inside a black framework. Additionally, it is claimed, the light-surround presents "a gain in panoramic effectiveness." It produces a "virtually true-to-life perspective," according to RKO's supervisor of projection, Charles Horstmann.

However, some have said that the light-surround is distracting. Also, aperture filing becomes more critical since any spillage of the picture onto the surrounding reflective wings is visible as a ghostly extension of the main image instead of being absorbed by black masking; similarly, steadiness of projection and therefore maintenance of the mechanisms become more critical.

In early days of the industry a light-surrounded screen would have "washed out" the dim, dingy picture. Theatres had to be kept practically black and the image surrounded with black masking, to make it reasonably visible. As screen brightness improved, the contrast between bright image and black surroundings intensified.

According to theatre architect Ben Schlanger, co-inventor of the Synchro-Screen, the modern intense contrast produces eye strain, and, in addition, an unatural looking-out-of-a-tunnel effect that impairs illusion. Further, color pictures are now the rule rather than the exception, and Schlanger asks: "Do you put a black frame around a painting?"

At the demonstration in the large 58th Street theatre, RCA's J. F. O'Brien pointed out to the assembled showmen and reporters that very large houses, in which the largest practicable image "looks like a postage stamp" from the rear seats, are just the ones that can benefit most from the enlarged show area of the new device which, he insisted, is not so much a new screen as a new way of presenting motion pictures.

One complication, however, exists in large theatres, since many of them combine stage presentations with screen entertainment and the flaring screen structure cannot be flown to expose the stage. It is wheel-mounted and can readily be pushed to the rear, but this means that the stage cannot be set while the picture is being shown. Special programming is needed, with some form of front-of-curtain entertainment after the picture while the stage is being set; and again after the curtains close while scenery is removed and the screen trundled forward.

A trailer advertising the new screen as a glamorous attraction is loaned in advance to purchasers, and an exploitation kit is also furnished. These aids help in calling attention to the new attraction in advance and in spreading the news among those who have not yet seen it. But to those who enter an auditorium equipped with it, Synchro-Screen very effectively calls attention to itself; it fills most or all of the proscenium area with light and is by far the most brilliant and conspicuous object in the patron's range of vision.

IA-IP Amateur Radio Bulletins

Final Contest Details

By AMOS KANAGA, W6BAA

Secretary, Local 409, San Mateo, Calif.

HERE IS the list of prizes to date. There are others in the offing, but not definite to date so I prefer to say nothing until they are on hand, in case any should poop out.

The contest closes January 15, 1953, but only IA-IP contacts made in 1952 count. That is, you have until midnite December 31 to *make* the contact and until Jan. 15, 1953, to get the word to us so we can rack up the scores. ALL contacts count, both CW and phone and on any band.

The *1952 contest* (and prizes listed) are for most IA stations worked in 1952. The *all-time HIGH contest* (no prizes) is for most IA stations worked since VJ day; and that closes December 15th as scheduled. Entries received up to December 15th count in both contests if they cover contacts made in 1952.

WϕBVO Brother Paul Hunter of Local 191 was right up there this month and received the "Worked 10 IA-IP" achievement award with lots of spares, which means we no doubt will be shining up that "Worked 25 IA-IP Gold Award" for him soon.

Jim (always on the air) Evans WϕGSW promised he could grab off the Gold Award before Thanksgiving and darned if he didn't! Congrats, Jim! Incidentally, Jim is one of the heavy contributors to our list. Hardly a week goes by that we don't hear from him.

W9PTH Larry Applegate of 187 and myself had a very FB QSO recently and he is on most mornings, especially on 10 meters.

Remember the 10-meter propagation recorded tests that were run a couple of

years ago? Well, we are going to help out on that again for a while, on 28.6 and 28.7 at 9:00 A.M. PST, so get in on the tests and have a good old round robin with the boys.

Now, fellows, this is an out and out plea to you and here is the reason why. So many of you ask for mimeographed lists of the IA amateur radio men and offer healthy contributions to the expense of it. But why not add another dollar or so and subscribe to IP? The next and latest list will run in IP in January 1953. We are having one mimi'd and any of you can have a copy for free, but remember it keeps changing, so getting your IP regularly is really a *must*. A great many locals subscribe as a unit and get the special rate, so why not take it up at the next meeting?

We are just getting rolling on the CW set-up for you CW men. So far 40 meters seems to be the most popular with 20 next—15 meters being what it is now, it will stay as recently suggested, a calling frequency of about 21,050—40-7250 (in-

CONTEST PRIZE LIST

MARMAX ELECTRONICS:
Kilowatt Rothman Marmax Modulator.

WORLD RADIO LABS.:
B and W Grid Dipper.
Two $10 merchandise orders.
One $5 merchandise order.

GONSET COMPANY:
One Gonset 100%-er.
One Gonset Noise Clipper.
One roll Gonset line.

SAN FRANCISCO RADIO:
One de luxe microphone.

correctly listed as 7050) and 20-14350 are for CW only and approximate, what with QRM, etc. According to your letters, gang, best bet seems to be 7050.

Memo: W6LYD of Local 401 finally has his mobile xmitter perking fb but now his receiver is haywire!

W6UMZ of 159 Jack Steurhoff needs but two more for his Gold Award. Jack is just across the Bay from me, in Oakland, and we both usually chat mobile while going home from work and compare who got the most hours in that night!

Keep pluggin' along now, gang, for more 1952 contacts . . . time's a gettin' short and those prizes just ain't to be sneezed at. Take another look at that list of prizes. Let's not forget the donors and give them some bizz whenever we can. Yep, and be sure to mention IP. It helps you and IP. Monday mornings are the best time as most of the IA boys try to be on then, but any week day is usually pretty good hunting.

And a very merry Christmas to you and yours!

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Meany Succeeds Green as President of AFL

STARTLING changes in the top personnel of the labor movement marked the month just past. Philip Murray, president of the CIO, died November 9; on November 21, William Green, president of the AFL, passed away. George Meany, AFL secretary-treasurer, was elected successor to Green on November 25, and on December 4 the CIO chose Walter Reuther, president of the United Auto Workers, to succeed Murray. In both organizations the passing of the top leaders led to renewed talk of a merger.


President George Meany

William Green was laid to rest at the age of 82 amid the praises of the most eminent of his fellow citizens. President-elect Eisenhower said of him: "He has been a real American and a great national figure." President Truman said: "He was a fine American patriot who dedicated his life to the service of those who work."

William Green was born in 1870 and began his working career at the age of 14 as water boy for a railroad construction crew. At 16 he was a coal miner, working beside his miner father. It was at meetings of the mine union locals that Green began to find himself as a natural leader of men. He entered politics; served two terms in the Ohio State Senate beginning in 1911, and there introduced and piloted to enactment a number of legislative measures for improving the lot of workers; but his real field of service lay within the labor movement.

From the presidency of his own United Mine Workers local he became in succession secretary-treasurer of the UMW, vice-president of the AFL and, in 1924, AFL president.

The new AFL chieftain, George Meany, whose father was president of a unit of the Plumbers and Steamfitters Union, joined the same organization in 1915, became one of its business agents in 1922, was elected president of the New York State Federation of Labor in 1934; and from 1939 until November 25, 1952, has been AFL secretary-treasurer.

Samuel Gompers, William Green's predecessor, believed in direct economic action by trade unions, independently of politics, to improve the workers' status. Green, who as a member of the Ohio State legislature had played a part in improving the status of the worker through legislation, believed in uniting economic action with the political approach. President Meany, in his statement to the press immediately after his election said in part:

"I had the pleasure of talking to Gen. Eisenhower, the President-elect, a few days ago and I assured him of the complete cooperation of the American Federation of Labor in all of his efforts to make America a better place to live, in all his efforts to keep America and her friends and her allies free.

"I also informed the President-elect that we intended to push for improvements in the standard of life and in the legislative field.

"I might say to you here that the American Federation of Labor is prepared to go before this session of Congress with any number of suggestions for improvements in legislation."

Labor Scarce, Recorder Makers Say

Skilled labor is their bottle-neck at present, manufacturers of sound recording equipment have told the National Production Authority, not scarcity of materials. Shortage of electronic engineers was called particularly acute. The industry's Advisory Committee canvassed with Department of Commerce authorities the possibility of importing trained aliens who are not security risks to alleviate the shortage.

Conference on Photography

To celebrate its 100th anniversary the Royal Photographic Society of Great Britain will hold an International Conference on the Science and Applications of Photography in London September 19 to 25. All persons taking an interest in photography, including cinematography, are cordially invited to attend; and to submit papers for discussion if they wish.

LETTERS

(*Continued from page 22*)

splicing. There are many things that enter into film splicing besides film cement. This I know from the many years I have been connected with the motion picture industry, and that dates back to 1905. I have made thousands of splices.

I agree with him 100 percent, that there are film cements that are good and some also not so good. No doubt you have heard of ETHYLOID film cement. Its splices hold, providing they are made right. If you could get a look at some of the splicers that are being used in theatres nowadays you would then realize why a lot of splices don't hold. In my experience 80 percent of splicers now in use should have been in the junk pile long ago, but the projectionists have to use them or nothing. The old time splice made by hand is, in my opinion, a much better job.

But as to the projectionists liking a thick cement, on that point I can't agree with you. They get a cement that is a little thick and the first thing they do is dump some kind of thinner in the can or bottle and right there and then they ruin the cement, the thing they use to thin the cement is something some other projectionist has told them about.

I claim from experience that the top side of the splice should be roughed on either nitrate or safety film, and especially safety film. We have found that some film supports are so thick, that it is impossible for film cement to get through to the base, unless stub is roughed.

I have enjoyed the articles in IP very much. They sure are a lot of help to the new projectionist and go a long way with some of the old ones.

Keep up the good work.

R. J. Fisher
Fisher Mfg. Co.
Member, Rochester L. 253

To the Editor of IP:

IP's articles on safety film are very interesting to me. I use Kodak Film Cement in ½-ounce bottles, and a Griswold R-2 splicer.

For scraping film I use a paper-and-sand finger file; and as this wears smooth I keep cutting away the tip until it is down to one inch long. Then I discard it.

I scrape the emulsion with the film in the splicer. I scrape the back of the film by pressing it against a flat and even portion of my work bench. The gritty particles of the sand file are cleaned off the film while scraping: this is easy to do.

I would like to try the dioxane Mr. Mitchell mentions but cannot get it in drug stores.

Lester Van Buskirk
Maltz Theatre
Alpena, Mich.

The American Labor Movement

Prepared by the Department of Labor for official use and reference, this history traces labor activity and legislation from Colonial times to today.

Chapter IV.

The Second World War and After

THE attack on Pearl Harbor brought all groups of labor and management together in a common cause. Shortly after the declaration of war on December 8, 1941, President Roosevelt called a conference of union and industry leaders, at the conclusion of which he announced a voluntary pledge from labor not to sanction strikes for the duration of the war in return for a pledge by management not to permit lock-outs. These pledges were parts of an agreement establishing a National War Labor Board to consider all labor-management disputes affecting the war effort, and to provide procedures for their peaceful settlement. This Board, set up in January 1942, was composed of representatives from labor, management, and the public at large. Regional boards were organized on a similar basis, to handle controversies of local importance. As in the earlier National Defense Mediation Board, which had sought to adjust disputes affecting the rearmament program, labor representation was equally divided between the AFL and CIO.

In December 1942, representatives from three major labor groups (AFL, CIO, and Railway Brotherhoods) were appointed to the Management-Labor Policy Committee, a consulting body for the War Manpower Commission. Similar joint committees were appointed in the regions and local areas to assist in the over-all program of providing workers for war industries. These committees gave practical advice and suggestions in the training, recruitment, and transfer of workers.

Organized labor also played an active role in many phases of the war production program. It was represented on the first defense agency, the Advisory Commission to the Council of National Defense, established in May 1940. With the creation of the Office of Production Management in January 1941, Sidney Hillman, president of the Amalgamated Clothing Workers of America (CIO), was appointed by President Roosevelt to share authority with the Director General, William S. Knudsen, president of General Motors.

Under the auspices of the War Production Board, labor-management committees were established in many plants for the purpose of stimulating output and reducing employee absenteeism. In addition, most of the other war agencies established plans whereby the unions participated in the various Federal programs.

With the marked rise in employment, and the participation of representatives of organized labor in the wartime activities of the Government, union membership increased. Assurance that unions would not be undermined by foregoing their right to strike, or by wartime shifts in employment, found expression in the War Labor Board's "maintenance-of-membership" formula. This provided in general that workers should become and continue to be members of the union as a condition of employment.

Although wages were held in check by the Government's stabilization policy, workers obtained various so-called "fringe" benefits, such as improved vacation and holiday provisions, shift differentials, and welfare and pension plans. Finally, leaders of the AFL and CIO agreed to suspend rival organizing campaigns where these might interfere with the war effort.

Unions Grow

On the whole, the war provided organized labor with perhaps the greatest opportunity in its history to extend union organization and influence. Union membership steadily increased at the rate of about a million workers a year, with the greatest gains in the shipbuilding, aircraft, automotive, and other war industries. Between 1941 and 1945 many unions in the metal trades doubled and tripled their memberships. The United Automobile Workers (CIO) in 1945 reported a total dues-paying membership of 1,052,000, the largest recorded by an American union up to that time.

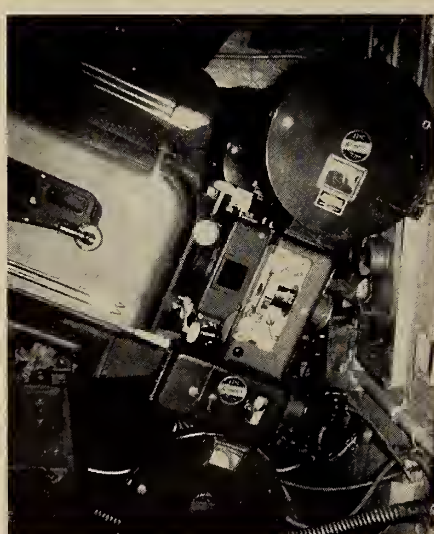
During the war, few national unions came into existence, although certain unaffiliated unions, such as the National Federation of Telephone Workers and the Foreman's Association of America, gained new prominence. Collective-bargaining agreements were extended over large sections of industry. Strikes occurred but union leaders and Government representatives sought their speedy settlement. Some issues were postponed when it was found that they could not be settled within the existing framework of control.

Extension of union membership to workers without regard to race, creed, or nationality, which had been gradually increasing over the years, was greatly accelerated during the war. Expanded employment of Negroes, particularly in the mass-production industries, made their acceptance into the unions on an equal basis imperative if wage and working condition standards were to be maintained. Prejudices which had existed through the years gradually broke down as white and Negro workers learned to respect each other as fellow workers on the job. Most unions which had previously refused to admit Negroes to membership relaxed their rules and removed racial restrictions from their constitutions.

In the West and Southwest particularly, the National Farm Labor Union, chartered by the AFL in 1946, sought to protect and improve working standards threatened by Mexican laborers and migrant farm workers, who accepted wages below those necessary to maintain adequate living standards.

To carry out its program, the NFLU conducted a two-pronged campaign with the assistance of the AFL. Legislation was sought, on both a National and State level, to improve the working standards and living conditions of migrant workers, and to prevent the further importation

RE-EQUIPPED PROJECTION ROOM



One of the newly installed Simplex X-L mechanisms at the Rivoli Theatre, Broadway and 49th Street, New York City, is pictured here. The Rivoli was given the "full treatment" by National Theatre Supply's Allen G. Smith, NYC branch manager, and now is equipped with three of the above-pictured mechanisms, three Peerless 150-ampere arc lamps, 120 watts of Simplex Four-Star sound, Bausch & Lomb four-inch diameter f/2.0 lenses, and spot and effect lamps. New equipment was installed in time for the premiere of "Snows of Kilimanjaro." Projection crew at the Rivoli are L. Alter, J. Borthwick, A. Brenner, A. Borgman, J. Edelstein, W. Garbade, J. Kaplan, N. Krikarian, B. Nedove, and F. Verno, all members of Local 306. The manager is Montague Salmon.

of farm labor. At the same time, organizing drives were conducted to bring more workers into the union in order to make true collective bargaining possible.

The end of hostilities in 1945 confronted organized labor and employers with a host of new problems. More than 10,000,000 service men and women were demobilized in the 12 months following VJ-day, August 14, 1945. Thousands of factories retooled to meet the demands of a civilian, peacetime economy.

Postwar Conflict and Readjustment

Many factories cut their scheduled hours from wartime levels of 48 or more a week to 40 and less. Others shut down temporarily or permanently. Wage earners, confronted with serious losses in "take-home" pay, sought to maintain their wartime earnings. Accordingly, union demands soon crystallized into requests for wage-rate increases of about 30 percent—the approximate advance workers deemed necessary to preserve their former earnings. Many employers, uncertain of the speed with which reconversion could be accomplished, and opposed to the continuation of price and other wartime controls, voiced their inability to meet the wage proposals of organized labor.

This conflict between labor and management was further aggravated by the partial termination of stabilization restraints, which had held the upward movement of the cost of living and of rates of pay within moderate bounds during the war years. The War Labor Board's "Little Steel" formula, which sought to confine increases in wage rates to a level not more than 15 percent above January 1941, had prevented the abnormally high rates of pay which characterized some industries in World War I.

Both labor and management wanted to be free to bargain across the conference table and, if necessary, to test their economic strength. These desires were expressed by many representatives of labor and of management and were reflected in Government policy as hostilities ceased.

On August 16, 1945—less than 48 hours after VJ-day—President Truman announced that the National War Labor Board would be terminated. During the war the Board had weathered numerous crises, but pressure for revision of its "Little Steel" formula, or for outright abandonment of stabilization controls over wages, rose steadily in 1945. On August 18, President Truman issued an order permitting wage increases without specific Government approval, provided the increases would not serve as a basis for higher prices or added cost to Federal agencies purchasing goods or services from contractors. The stage was thus

set for a return to "free" collective bargaining within the framework of existing price levels.

Wage adjustments were not made easily in many large industries. Beginning in the autumn of 1945, a wave of strikes engulfed the oil, automobile, steel, and coal industries. This unrest in the labor movement prompted President Truman to call a national labor-management conference in November 1945, with the hope that some formula for industrial peace could be reached. The conference produced few tangible results, and controversies continued. Altogether, 42 large strikes, each involving 10,000 or more workers, occurred from VJ-day to the end of June 1946.

Out of these disputes a wage increase "pattern" of 18½ cents an hour evolved for some major mass-production industries, particularly those producing automobiles, steel, electrical equipment, and rubber tires. Hundreds of thousands of other workers also obtained substantial increases. The average increase was approximately 14½ cents for all workers receiving "first round" postwar increases.

In resisting postwar wage increases, many employers pointed to the difficulties of absorbing such increases so long as prices of their products remained subject to Government control. Largely as a result of these protests, the Office of Price Administration, which had "policed" prices during the war, was permitted to expire on June 30. Although the "OPA" was revived a month later on a limited basis, by the end of 1946 virtually all price controls were ended.

The "second round" of postwar renewal of union contracts began in the autumn of 1946. Production by that time had reached record peace-time levels and business was generally prosperous. For the most part, management and labor came to terms without the costly stoppages which had marked the preceding year's bargaining.

[TO BE CONTINUED]

Technicolor Net Profits

Technicolor, Inc., consolidated net profit for the third quarter of 1952 was equivalent to 50 cents a share, as against 54 cents for the same period in 1951. For the three quarters of 1952 thus far elapsed net profit was $1.60 per share as against $1.68 for the corresponding period last year.

These profit figures allow for taxes to date in each case and adjusted to the effective rate for the entire year. In total amounts they are $474,087 for the third quarter of 1952; $500,131 for the third quarter of 1951; $1,499,507 for all three elapsed quarters of 1952; $1,561,525 for the first three quarters of 1951. Dr. Herbert T. Kalmus, president and general manager, released the statistics.

New 16- and 35-mm Edit Machines

A new editing machine available in 16-mm and 35-mm varieties will be placed on the American market by S. O. S. Cinema Supply Corporation. The device, known as Acmiola, originated abroad, and American purchasers have not been able to get delivery in less than 1½ to 2 years after placing an order, according to J. A. Tanney of S. O. S. Formation of a new Acmiola Distributing Company as a division of S. O. S. has now been completed and will result in delivery time of three months or less, Tanney explains.

OBITUARIES

Paul Stanley Bouchey, 58, Local 199, Detroit, Mich.

Linus H. Albee, 51, Local 486, Hartford, Conn.

Henry W. Hill, 53, Local 199, Detroit, Mich.

Monroe U. Morrow, Local 115, Jacksonville, Fla.

PERSONAL NOTES

Charles K. Flint, under whose leadership Eastman Kodak changed over from nitrate to safety professional motion picture film, retires from active service as vice-president and general manager of the Kodak Park Works on January 1st. An MIT graduate, Flint has been with Eastman since 1911, rising through successive stages to become a vice-president in 1941, and a director in 1945. Under his management the 20,000 employes of the Kodak Park Works not only changed professional motion picture film from nitrate to safety, but also developed the economic large-scale production of color film and papers for amateurs, and supplied the government with vast quantities of sensitized products during World War II. New general manager of the Kodak Park Works will be Ivar N. Hultman, who has been with Kodak since 1919 and became a vice-president in 1945.

C. Bruce Linton, who will shortly receive his Master's degree in cinema from USC, and who is producer of the public relations film, "Leaders for Tomorrow," has joined the staff of Bailey Films, Inc., 16-mm producers and distributors. Albert R. Bailey, president of the organization, announced the appointment.

Adolph Stuber, Eastman Kodak vice-president, has just celebrated the anniversary of his 40th year with the company. He joined Eastman in 1912, a few months after graduating from Cornell as a mechanical engineer; took time out to serve with the Army in World War I; was appointed general manager of the Camera Works in 1923; became a vice-president in 1942, and a director in 1947. Stuber is a Fellow of both the Photographic Society of America and the Royal Photographic Society of Great Britain; and a member of the board of the National Foreign Trade Council.

New Electronics Catalog

Terminal Radio Corporation has issued a 130-page, thoroughly illustrated free catalog listing many varieties of electronic equipment including amplifiers, speakers, microphones, record players, radios and radio tuners, test meters, electronic items and television receivers and items. Prices are cited, and technical specifications submitted in detail: for example, an audio amplifier is rated as to power output, percent distortion, frequency response, hum level, gain, input and output impedances, power required, tubes required and physical dimensions. Terminal equipment can be ordered by mail for delivery anywhere. Readers interested can obtain a copy of the catalog without charge from Terminal Radio Corp., 85 Cortlandt Street, New York 7.

SS United States Wired by RCA

The two modern motion picture theatres built into the new luxury liner, SS United States, are both RCA-equipped, according to H. K. Peebles, purchasing agent for the Newport News Shipbuilding and Dry Dock Co. The ship, largest passenger liner ever constructed in this country, is expected to carry many stars of the entertainment world between here and Europe. Standard RCA theatre equipment was found to meet all specifications except for one detail—the speaker baffles had to be reconstructed of fire-proof transite.

Iran has imported nearly 1,000 portable 16-mm projectors, and a number of larger ones, during the past year, according to Nathan D. Golden of the U. S. Department of Commerce.

Bailey Films, Inc., offers a free 52-page catalog. The organization maintains a substantial library of 16-mm and 8-mm sound and silent, black-and-white and color prints.

Not Enough Copper Scrap

Current copper imports may be offset by scarcity of copper scrap, National Production Authority officials announced last month. Scrap copper is not continuing to come in with any degree of regularity, NPA finds; and the improvement that was expected to result from the imports may thus be lost by the non-appearance of anticipated scrap. The aluminum supply is also somewhat inadequate, owing to power shortage in the TVA region and the Pacific Northwest, it was revealed.

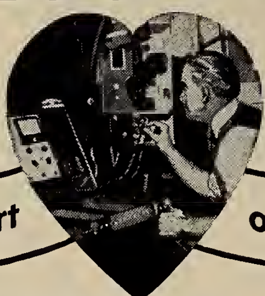
BOOK REVIEW

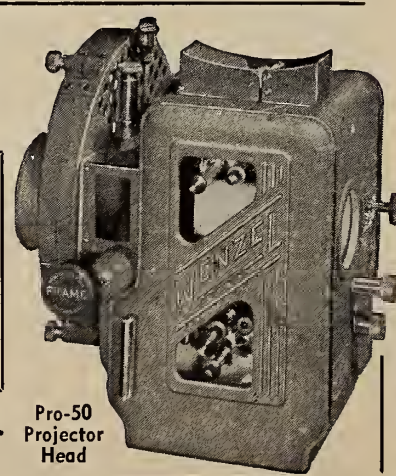
SECOND ANNUAL YEAR BOOK OF THE CANADIAN MOTION PICTURE INDUSTRY, 1952-1953 EDITION, 224 *pages*, 6 x 9⅛th, *editorial index, published by* FILM PUBLICATIONS OF CANADA, LTD., 175 *Bloor Street, East, Toronto* 5, *Ont., Canada, Price:* $2.25, *free to subscribers to Canadian Film Weekly.*

Well printed and bound in stiff, wine-red covers stamped with gold, this publication offers detailed data and statistics on the motion picture industry of Canada from Newfoundland to British Columbia.

Subjects covered include the history of the industry with special reference to Canada; Canadian production, distribution and exhibition today; a directory of Canadian theatres; general information and statistics; industry organizations; I. A. and other unions; television; equipment; censorship; awards; 16-mm and other material.

The U. S. Department of Commerce finds that United States films account for about 70 percent of the grosses in Spain, in competition with Spanish, French, Mexican, Argentine, Italian and German product, which share the remaining 30 percent.





Cinerama Uses Excelite

Cinerama's designers selected the National Type 55000 Exelite arclamp for their projection system after testing other makes for comparative steadiness, it is now disclosed.

The illumination problem in Cinerama is to get three different lamps, located in as many projection rooms, to throw light of absolutely identical intensity and color on the panels that make up the composite image. A perfect solution to this problem has not yet been attained.

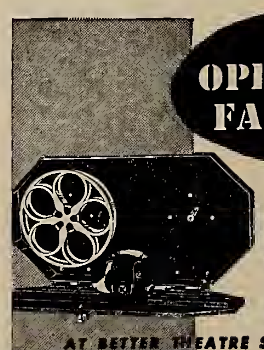
IP reported in October (page 11) that the projection light "is often unmatched as to both brightness and color tone." But Cinerama's engineers fully understood the nature and difficulty of their problem in this respect, it is now revealed, and undertook extensive comparative tests of leading makes of arc lamps for their ability to maintain constant light intesity and constant color temperature without manual adjustment. They chose Excelites as coming nearest to perfection in this respect.

GPL TV in Jersey Theatre

Fort Lee, New Jersey, the community across the Hudson from New York where motion pictures were made before there was a Hollywood, is the latest to be provided with theatre television. General Precision Laboratory, affiliate of National Theatre Supply, has installed a direct projection system in the Lee Theatre there in time for the "Carmen" telecast from Metropolitan Opera House. The Lee, operated by B. S. Moss Company, has 1,500 seats, priced for television opera at $1.80, $2.40 and $3.60.

16-mm Oscars to Three Universities

University Film Producers Association has presented its first series of annual awards for outstanding 16-mm films to three mid-Western universities. These are: "The Face of Youth," relating to community mental health programs, by U. of Wisconsin; "Development of the Frog," a biology film by Ohio State U., and "Weighing with the Analytical Balance," by U. of Minnesota.



Transistor Goes to Work

One of the first transistor-equipped electronic units to be put into common commercial service is the six-tone oscillator unit pictured here. In it the six tiny, button-like projections on the left surface take the place of vacuum tubes in performing the functions of audio frequency oscillators. They generate audio signals at six different frequencies, combinations of which represent digits dialed by a telephone user. This particular unit is one installed in Englewood, N. J., to enable users to dial direct, and without intervention of an operator, telephones as far away as San Francisco.

The same automatic long-distance dialing can be achieved with vacuum tubes instead of transistors; but the transistor (see IP for November, 1952, Page 12) is smaller, lighter, needs less power, generates incomparably less heat in operation, and is expected to prove sturdier than a vacuum tube of corresponding capability.

L. E. Blount (left) and Dr. William Shockley, both of Bell Laboratories, examine one of the six-tone transistor oscillators which they helped develop and which are now in regular telephone service.

Transistors can perform most of the functions of vacuum tubes. The unit pictured here represents only one of the first of what are expected to be innumerable applications of this new device to routine electronic performance.

Ideal Pictures announces they are now authorized to release seven Walt Disney cartoons on 16-mm, for rent, throughout the United States. Three of these are documentaries and four are Disney cartoons. All are in Technicolor. Rentals can be arranged through any of the regional libraries which Ideal maintains in 27 cities from Boston to Honolulu.

IA ELECTION

N. Y. STATE ASSOC. OF M. P. P.

Earl Tuttle (Binghamton L. 396), *pres.*; George Raaflaub (Syracuse L. 376), Harry Lackey (Utica L. 337), John F. Short (Corning L. 480), *vice-pres.*; Charles F. Wheeler (Geneva L. 108), *sec.-treas.*; Louis Goler (Rochester L. 253), *sgt.-at-arms*; Gerald Henderson (Batavia L. 581), Henry Jeffery (Cortland L. 272), George Van Buren (Little Falls L. 609), Edgar Stewart (New York L. 306), Wm. Robacker (Middletown L. 311), *exec. board*; Fred Boekhout (Rochester L. 253), E. Stewart (L. 306), William Switzer (Hornell L. 672), and Francis Foran (Bradford L. 335), *educ. comm.*

CINERAMA IN THE PRESS

(*Continued from page* 17)

synchronization must be perfect. Occasionally it isn't. The vertical joins of the two side pictures with the central one are visible, and when an actor passes through this joint from the center to the side, or from the side to the center, his face and body fuzz. . . .

"Further, if one sits on the side of the theatre, the images projected on the nearest side of the screen roll up toward the top of the screen. Actors seem to walk up a wall and vertical objects become almost horizontal just before they disappear from view. . . .

"The long range future of Cinerama will be coupled with that of real 3-dimensional photography and projection. Together they could constitute an entertainment and esthetic phenomenon wholly beyond the resources of television, and one which owners of TV sets will be glad to go to a theatre to see.

"The immediate future of Cinerama . . . at least one theatre in every large city is sure to be equipped for Cinerama within a year or two, despite installation costs of about $75,000." *Films in Review* (published by the National Board of Review of Motion Pictures, Inc.), Henry Hart, Nov. 1952.

"Sound that often makes you feel that a live orchestra is hidden in the pit . . . breathtaking views . . . a thrilling experience, part three-dimensional illusion and partly a huge mural in motion. . . . This device has yet to show whether it can deal as acutely with people as with mountain ranges, whether it has pliability as well as size and can adapt to intimacy as well as to grandeur." *N. Y. Herald-Tribune*, Otis L. Guersney, Jr., Oct. 1.

ANSCO COLOR FILM

(*Continued from page* 16)

from regular black-and-white processing, although it is used whenever it is desired to tone an ordinary black-and-white print to sepia or some other color. When acted upon by the bleach solution, the silver of both the yellow filter-layer and the Ansco color picture image is reconverted into creamy-white silver halide. At this stage the natural color begins to show faintly through the film which now looks as though it had been thinly coated all over its surface with whiting.

5. *Final Fix.* After rinsing off all traces of the bleaching chemicals, the Ansco color negative film passes into a second hypo fixing bath. The white silver halide disappears, being dissolved by the solution, and the film now has nothing left on it but the brilliant, full-color complementary dye images of the scene shot by the camera.

In a regular black-and-white negative all tones are reversed — shadows and dark objects in the photographed scene coming out light on the negative, and the highlights coming out dark. So also with Ansco color negative film. And because *all* photographic values are reversed, the colors of the photographed scene are reversed to their complementary

colors—blue sky appearing as orange, red blood as pale blue-green, *etc.* Ansco color negative, therefore, is a true negative, and from it Ansco color positives are made.

After a final rinse to remove traces of hypo which might stain the film, the finished negative wends its way over the multitudinous loops of the drying cabinets and is wound up on a reel at the very end of the processing machine.

Soundtrack on Color Film

So far nothing has been said of the sound-track. Sound is not recorded directly on the picture negative in professional movie-making, but on sound-recording stock by a recording head driven in synchronism with the picture cameras. The original sound recordings may have either photographic or magnetic tracks, magnetic recording being in favor at the present time because of its high fidelity and low noise-level.

Whichever recording method is used, independently recorded sound-effects and background-music tracks are properly "dubbed" into the principal record of the dialogue and sounds that originated on the set during shooting. Sound mixing is accomplished by means of an apparatus which has several soundheads (reproducers) feeding their combined output into a single recorder. The chief recordist sits at the console of the mixer like an organist and manipulates the volume controls which regulate the strength of sound from all the simultaneously-playing tracks. The resultant, or mixed, sound is recorded photographically on a single film.

This film is the master sound negative from which a master sound positive and a number of duplicate sound negatives, used for printing the soundtrack on the theatre-release prints, are derived by contact-printings.

Release Prints

This brings us to the matter of making Ansco color soundfilm prints for theatre projection. Now, release prints are only very rarely made from the original camera negatives, not even in black-and-white work. As is the case with the soundtrack recording, a number of duplicate negatives are prepared for printing the release positives. The preparation of these picture dupe negatives is an interesting process, and provides a peep behind the scenes of professional film make-up.

Just as the rolls of processed negative film for a black-and-white movie must be harmonized and balanced for consistent density and contrast in the release prints, so also must the negatives for a natural-color movie be photographically adjusted. And with color film there is the additional problem of color-balance. (That is, the overall tone of the scenes must not vary in tint except for desired pictorial and dramatic effects. The color must be balanced to give the most natural results with the white light of the projection arc.)

These problems can be solved very simply and satisfactorily.

"But why," it may be asked, "is it necessary to make duplicate negatives from which to print the release positives? Why not print them directly from the original camera negatives, making all light and color-balance corrections during printing?"

This can be, and is, done on occasion; but professional productions involve optical effects which are not present in the camera negatives. These include fades, dissolves, wipes, photomontages, multiple exposures, travelling-mask shots, etc. It is considered unwise to cut these optical effects into the original camera

negative, a mighty precious commodity.

Then, too, it would be extremely foolhardy to risk damage to the original negative through the routine printing of several hundred release positives. In fact, in order to speed up the work and maintain good picture and sound quality, it is mandatory to make a dozen or so duplicate negatives, some of which will be sent to foreign countries for release-printing overseas.

From the original Ansco Color Type 843 Camera Negative Film a master positive film is printed. This may either be in full color by printing on Ansco Color Type 848 Positive Motion-Picture Printing Film, or (as is preferred in professional practice) the master positive is made in the form of three black-and-white positives, one for each primary color.

The Positive Soundtrack

The development process for Ansco color release prints is the same as that previously described for the negative, except that special treatment is given to the soundtrack in order to obtain a regular silver-image track.

Process dyes (cyan, magenta, and yellow) are quite transparent to that invisible infrared radiation to which the standard red-sensitive photoelectric cells used in projector soundheads are most responsive. For this reason, a silver-image is printed on both Technicolor and Ansco color projection positives. (The Cinecolor dye-toning process, on the other hand, employs pigments sufficiently opaque to low red and infrared radiation for good sound reproduction, hence the colored tracks on Cinecolor films.)

As we have seen, Ansco color processing is similar to black-and-white processing except for the insertion of a bleaching step which converts the black silver images to white silver-halide images that are finally eliminated by the final fix. The soundtrack development in the processing of Ansco color release prints follows after the bleaching step, but before the residual silver halide is removed by the final fix.

The film passes from the bleach bath to an "air squeegee" which effectively removes all surface moisture from the emulsion. From the squeegee the film passes directly to a developer-applicator which applies developer *to the soundtrack area only.* The developer reconverts the halide soundtrack-image back to a black silver image. (And, incidentally, the halide of the filter-layer gets changed back to orange-yellow colloidal silver in the soundtrack area.)

In the finished Ansco color release positive, therefore, the soundtrack has an overall orange-yellow color in which a silver-image soundtrack is present. Since this redeveloped filter-layer is transparent to red and infrared radiation, it does not appreciably attenuate sound-response with the red-sensitive photocell.

Dye soundtracks, even though infrared-transmissive, could be used, however, if the soundhead photocell were responsive only to visible, instead of infrared, radiation. Overseas a strontium cell with the sensitivity-peak coming in the green region of the spectrum has been proposed. Such a cell can work with magenta dyes, and thus eliminate the extra track-development step from the processing of release prints of the multilayer color-coupler dye type.

Interesting is the fact that the soundtrack may be printed in any one, any two, or all three of the emulsion layers of Ansco color film. If, for example, an indigo filter be placed between the light and the sound negative in the printer, the track will print only in the top indigo-sensitive emulsion. If the filter be cyan, transmitting both indigo and green light, the track will print in both the top and middle layers. With no filter all three layers will print.

The top indigo-sensitive layer was used for printing the soundtrack of MGM's "The Wild North." This layer has the finest grain and does not require any electrical high-frequency equalization to equal the frequency-response characteristics of black-and-white prints. Other laboratories, however, are obtaining good results with 2- and 3-layer tracks.

This description concerns the new Ansco color film as it is being made and used at the present time—a fact to bear in mind in view of continued progress in the popular and rapidly expanding process of making motion pictures in full natural color. Further improvements are inevitable. It is quite possible, for example, that the yellow filter-layer of colloidal silver may soon be eliminated.

PROJECTOR MECHANISMS HAVE IMPROVED

(*Continued from page* 12)

use of ball bearings on all drive shafts; steadier picture is produced by improved gate shoes and spring suspension; brighter screen image is attained by redesigned shutter blades of higher efficiency and by improved provisions for mounting 4-inch diameter lenses.

The water cooled aperture permits use of more intense light and therefore a brighter and larger screen image. Not only is the aperture cooled, but it is separated mechanically from the film trap, so that the only heat that reaches the film is that which comes through it with the light; the aperture operates at water temperature and the trap at room temperature, it is said.

Century's Larry Davee tells IP: "All of our engineering developments for the past 12 years have been directed toward higher light efficiencies and lower heat—in other words, more light for less money, less film distortion resulting in clearer, sharper pictures, with less maintenance and lower first cost to the theatre."

Ballantyne's "BW"

Effective January 1st 1953 the Ballantyne "BW" mechanism will also be available with water-cooling. Ballantyne's Bob Hoff adds: "It will be the only projector in the low-price field with this feature." (Century's Davee questions this, claiming that his mechanism is also in the low-price field). Ballantyne's water-cooling will be an optional addition, since smaller theatres do not need it.

Like some of the other mechanisms referred to above, the Ballantyne "BW" is a remote descendent of the Simplex Regular. It follows the same widely-popular general design; but is equipped with modern oilite permanently-lubricated bearings throughout, its case is larger and roomier, threading has been made easier, the focussing device has been moved to the front of the head, the lens mount accommodates today's 4-inch diameter lenses. In short, the "BW" has Simplex Regular on its family tree only as a distant ancestor. It is thoroughly modern in performance quality, in ease of operation, in durability; and with the addition of water-cooling, the Ballantyne "BW" is ultra-modern.

The "BW" is not made in Ballantyne's own plant, but manufactured for Ballantyne by the Wenzel Projector Company. Wenzel, of course, has a very up-to-date mechanism of its own which IP will describe in detail in a future edition.

1st Lieutenant
Lloyd L. Burke
U.S. Army
Medal of Honor

THE RED KOREAN strongpoint had stalled our attack; Lieutenant Burke saw that a breakthrough must be made. Rallying 35 men, he crept close to the enemy bunkers. He laid down a grenade barrage. Then he ran forward to an

exposed knoll and opened a one-man pitched battle. He turned a light machine gun into the Red position. He caught live enemy grenades in mid-air and threw them back. Once he killed three men with his pistol. Before sunset Lieutenant Burke and 35 men had defeated 300. The lieutenant says:

"Every day, men who fought in Korea are coming home. They're finding jobs—partly because they and you and I own nearly 50 billion dollars' worth of Defense Bonds. For Bond savings—which protect our own families—are also building a great backlog of *national* prosperity. Reason enough for investing in Bonds—don't you agree?"

★ ★ ★

Now E Bonds earn more! 1) All Series E Bonds bought after May 1, 1952 average 3% interest, compounded semiannually! Interest now starts after 6 months and is higher in the early years. 2) *All maturing E Bonds* automatically go on earning *after maturity*—and at the new higher interest! Today, start investing in better-paying Series E Bonds through the Payroll Savings Plan.

Peace is for the strong! For peace and prosperity save with U.S. Defense Bonds!

'Twas the night *after* Christmas

'Twas the night *after* Christma
And before a *full* house
Not a patron was stirring
Not even a mouse.
The success of my theatre
Is no secret, so hark:
My stocking was hung
Near my booth, for a lark.
On the morrow I woke
And spied Simplex X-L
Both projector and soundhead
All ready to sell.
Sell did I say?
For in every direction
Simplex has sold me
On much better projectio
Old Santa thus blessed me
And I'm no longer stewing
For my faith in St. Nick
I'm completely renewing.

Simplex
T.M. REG. U.S. PAT. OFF.

PROJECTION an
SOUND SYSTEM

MANUFACTURED BY INTERNATIONAL PROJECTOR CORPORATION • DISTRIBUTED BY NATIONAL THEATRE SU.